EDITORIAL

INDEX for the tenth volume of 'Metal Trades' is now ready. Drop a line to the circulation department and the index will be sent by return mail.

THE Congressional Medal of Honor is the highest honor given in the United States Army during the War. An indication of the qualifications considered necessary may be gathered from the fact that out of 78 men receiving it, only 54 survive. These 78 men were distributed among 24 States, and it is interesting to note that California stands well toward the head of the list with six medals to her credit.

WAR-RISK Insurance changes effective December 24, 1919, are of interest to ex-service men. The list of allowable beneficiaries has been lengthened and the rate of compensation for various disabilities increased. Men that have allowed their insurance to lapse can be reinstated at any time within 18 months after discharge, provided they are in as good health as at the time of discharge, and can be reinstated any time within three months after discharge, irrespective of health.

THE straw-vote season has arrived and will be with us until November 2. Two votes recently taken are of interest. One at the Engineers' Club of San Francisco showed 51 votes out of 72 for Mr. Herbert Hoover. General Leonard Wood received 16, and no other candidate more than one vote. It was to be expected in this gathering of members of the same general profession as Mr. Hoover, many of them his personal friends, that the majority in his favor would be particularly large. But the sentiment in that direction at the Commercial Club of Fresno, where neither of these causes operated, was almost equally strong. Out of 60 votes Mr. Hoover received 39, the remaining ballots being divided as follows: Johnson, 10; Wood, 3; Edwards, 3; Wilson, 3; Lowden, 2; scattering, 3.

THE manner in which our contemporary, 'The Labor Clarion', gets all excited over the anti-strike clauses in the Cummins bill is not in accordance with its usually sane moderate attitude on controversial questions. On the other hand, in discussing a recent strike of teachers at Lebanon, Indiana, it states that had these teachers "been members of the American Federation of Teachers there would have been no strike, because the organization is opposed to strikes, knowing that there are other and better means of adjusting their differences available to organized teachers who are affiliated with the labor movement". If this is true, and we believe it is, for organized teachers, whether or not they are so affiliated, would it not be possible to develop 'other and better means' of adjusting labor difficulties on the railroads? And is not this what the Cummins bill proposes to do?

IN the article on the work-routing system of the Standard Gas Engine Company the sentences commencing at the third line from the bottom of page 82 should be corrected to read as follows: "Stock in stock-rooms is listed on the form shown in Fig. 4. This form is printed on colored cards, the colors designating the different types of engine. Small tags of different colors show the department where unfinished stock is in process of manufacture, making it possible to determine from the cards the progress and location of any lot going through the factory." The correction reached us after this part of the issue had gone to press.

VITAL statistics are usually rather dry reading, but the recent statement of Dr. Rupert Blue, Surgeon-General of the United States, that the annual death-rate in the United States has been reduced during the past 20 years from 17.6 to 14.2 per thousand, is different. Expressed in other words, had conditions been the same last year as they were 20 years ago, 350,000 persons would be dead that are today alive and well. This is several times the total number of deaths from all causes in the Army during the War. Perhaps even more impressive is the fact that this number is about the same as the probable number of deaths directly or indirectly the result of the influenza epidemic. Expressed differently, we could have an influenza epidemic every year and still be no worse off than we were 20 years ago with only the so-called ordinary diseases to combat.

UNION officials of the Building Trades Council of Spokane are talking of combatting an open-shop movement in that city by having the local unions take contracts for buildings, employing their own members. They point out that the union funds would be ample to finance the work. As long as competition between the unions and the old contractors remains on a strictly business basis and there is no intimidation on either side, the general public should welcome such an experiment and say "Let the best man win." Given the conditions already outlined, the unions would be able to continue in their new activities only in case they could obtain as good or better efficiency than their competitors. If they can do so, more power to them! If, on the other hand, as we strongly suspect will be the case, they find that meeting the payroll every Saturday night and standing off the material men is a bigger job than they expected, they will feel more tolerant toward the employer when the next labor dispute occurs. It is a truism that understanding

Generated on 2024-09-30 02:08 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

of the other fellow's problems is a prerequisite for friendly relations of any kind. The proposed plan at Spokane also indicates a way by which the organized worker in any line can obtain real industrial democracy if he wants to take the trouble.

A Little too Strong

Although the intentions of the members of the New York legislature that voted to suspend five duly-elected Socialist members were doubtless excellent, we believe their action constituted a serious blunder. It is probably true that the Socialist party has always favored radical changes in our Government, and it is also true that many, perhaps most of the leaders of the party at the present time, are no longer satisfied with trying to bring about such changes in an orderly way. Nevertheless, it remains to be proved that these particular men, who have been suspended, are unfit to hold their seats. The Berger affair is not a parallel case. He has been thrown out of Congress twice, amid the general applause of good citizens, because he has been actually convicted of plotting against the Government and giving aid and comfort to the enemy. It would be entirely possible to stretch the New York precedent to interfere seriously with the rights of a minority party.

Help the Armenians

Whether further American assistance should be extended to the European countries, and if so, how much should be extended, are fairly debatable questions. There is no question, however, about aid for the so-called Near East. Unless help is forthcoming to carry the inhabitants of that unhappy land until the next harvest, hundreds of thousands of its inhabitants must die. We will not repeat here the statements of responsible observers as to the almost incredibly horrible conditions of starvation and want existing there. The people must have help during the remaining months or they cannot survive. And this help is not to a people that are going to allow themselves to be pauperized by American gifts, but rather to a people that have already gone to work and will be self-supporting as soon as the crops of the coming season are available. The headquarters for Near East Relief are at 328 Flood building, San Francisco. In the name of Pity, give and give quickly.

One Way Out

The G. M. Standifer Construction Company of Vancouver, Washington, is one of the firms that complied with union demands and paid the eight-cent-an-hour raise last October. Unlike some others, who returned to the old scale as soon as their Government work was completed, the Standifer company is paying the increased scale on new contracts with private concerns. For the company to do this and remain solvent, however, requires that employees produce more than in the past, and the problem has been placed squarely up to the labor unions. In consequence, several unions have issued letters to their members, pointing out the desirability from the standpoint of the employee of having the company continue its operations, and calling upon all members for their cooperation in increasing production. It is too early to judge of the effect of these letters. It is one thing to tell a man, even to have him admit, that increased production is for his interest, and quite another thing for him to strive month in and month out to obtain that increased production. We do not know whether the officers of the Standifer company expect to add any special incentives such as premiums or bonuses, but if they are able to increase production at least in proportion to the increase in wages, they will have made a great step in advance. As we have so often stated, it is not high wages but high production cost that is bothering the metal industries of the Pacific Coast, and the employer who opposes high wages as such, is just as foolish as the labor leader that tries to limit output.

Steel Strike Off

Three and a half months after the steel strike was called, and a considerable time after its failure had become evident, the leaders called the strike off while announcing that the campaign for organizing the steel industry would continue. They stated that the steel companies had the active assistance of Federal troops, State police, and many public officials, virtually admitting that prevention of violence was a large factor in causing the failure of the strike. It is estimated that the direct loss of production has been in the neighborhood of 2,500,000 tons of steel products. This figure gives an idea of the direct losses, both to the workmen in wages and to the companies in products, but the indirect losses, such as to the storekeepers in mill towns, and to the users of steel products, were so varied and so far-reaching as to affect almost everyone in the country. The public will not look with favor upon anyone, either employer or employee, who fails to do his utmost to prevent a repetition of this dispute. The extent to which the steel industry had already recovered from the first effects of the strike by the time it was called off can be judged from the December production-statistics, which show an average output of pig-iron of 85,000 tons per day, with 11 more furnaces in blast at the end of the month than at the beginning. With the exception of August this output was larger than for any month since March of last year, when the decline following the Armistice commenced. During the last eight months of 1918, the average production was not far from 110,000 tons per day, which might be taken as the maximum practicable output with the present facilities. Statistics of steel production, which had not been announced for several months, are also now available.

Generated on 2024-09-30 02:09 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

These show a very decided drop in output during October to 1,295,000 tons, almost exactly half that of October 1918, which was the maximum recorded. The recovery from that low point was rapid, the December production being 1,916,000 tons. Since the coal strike was not settled until nearly the middle of the month, it is probable that both blast-furnaces and steel-mills could have attained approximately normal production during December had a normal supply of fuel been available.

Wooden Ships Again

The final chapter in the history of the wooden shipbuilding operations of the Government, on this Coast at least, was written when Mr. George F. Rodgers, a shipbuilder of Astoria, agreed to dispose of the 34 unfinished hulls at various Coast yards upon payment of $5000 each. This payment, mind you, is by the Emergency Fleet Corporation to Mr. Rodgers, not by Mr. Rodgers to the Corporation. Mr. Rodgers may complete the hulls, he may break them up for the materials they contain, he may even burn them. In fact, the Corporation does not care what he does as long as he gets them out of the way. When the United States entered the War, much was expected from wooden ships. It is probably true that the output of steel and wooden ships combined was slightly larger than would have been possible had attention been concentrated on the steel yards, limited as these were, for a time at least, by the capacity of the plate-mills. However, by the time the signing of the Armistice had reduced the necessity for tonnage of whatever kind, both Shipping Board officials and shipping men in general had become convinced that a continuance of the wooden-ship program was not advisable. This is not to say that many serviceable wooden ships had not been constructed, but there was little desire to use them for long voyages, and the ships built on the Pacific Coast in particular, suffered from the fact that the Shipping Board designs were not suited either to Pacific Coast timber or to Pacific Coast operating conditions. Not long after the Armistice was signed, work was stopped on all uncompleted hulls, and later these were offered for sale to private parties at the uniform price of $75,000. A few hulls were sold at this figure, presumably those that were most nearly completed, but in general, the shipping men failed to come to the bargain counter, until finally the remaining 34 hulls were recognized as a liability rather than an asset, and handed over to Mr. Rodgers.

Why not a Coast Association

This paragraph is addressed to those who believe in having a local metal trades association. If you do not believe this, there is not much use in talking to you. We also hold that the National associations have an important field and that they are doing good work in that field. But the centre of their activities is a long way off, so that the Pacific Coast metal-worker is not in a position either to give much to, or to receive much from, the Nationel associations. Conventions are very properly held at some Eastern or Middle Western city, and the number of Pacific Coast men that are able to spare both the time and the money to attend is negligible. Yet the Pacific Coast employer sorely needs something wider in scope than his local association. He needs to exchange ideas about technical, trade, and labor problems with men in other States. A Pacific Coast Metal Trades Association and a Pacific Coast Foundrymen's Association, or perhaps a combination of the two, would find plenty of useful work cut out for it. Labor relations alone would give the association plenty to do. The labor men have a Coast association in the Pacific Coast District Metal Trades Council, which at its recent annual convention took a number of steps leading toward a closer union between the various local councils, including the adoption of a coast card for members. However the present labor troubles may end, whether the employers deal with union officials as such, or whether they refuse to do so, they need a Coast organization. If they deal with the unions, and the unions have a Coast organization and the employers have not, the employers are at an unnecessary disadvantage. If they are not going to deal with unions, they will need a strong organization to withstand the pressure. It is not, however, as a militant organization that such a body would find its chief field, but rather in fostering co-operation not only between employers, but also between employers and employees, and between employers, employees, and the public. This is a large order but we believe that it could be filled by a Pacific Coast association properly supported, not only in cash but also in good hard work, by the men in the metal trades.

Hoover for President

Like most popular movements, the sentiment in favor of Mr. Herbert Hoover for President gathered slowly and quietly for a long time before much of it appeared on the surface. During the past month, however, the demand has become general. When periodicals so widely separated and so different in character as the Boston 'Congregationalist', the New York 'World', and the San Francisco 'Mining and Scientific Press' all announce their desire to see Mr. Hoover in the White House, it is time for even the politicians to sit up and take notice. In contrast to the throng of other Presidential possibilities, active and passive, some of whom are practically unknown, and some of whom we know only too well, Mr. Hoover stands out as the man that has made good on every job he tackled. And what hard jobs he has tackled! Among all of our Presidents, there is not one that, when a candidate, had so thoroughly demonstrated his administrative ability as has Mr. Hoover. Successively head of the work for American refugees, of the Commission for the Relief of Belgium, of the United States Food Administration, and, finally of the Relief

Generated on 2024-09-30 02:07 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Organization for all Europe, he showed not only his ability but his disinterestedness. Few men in history have wielded so much power as he has done. Fewer yet have used their power so completely for the general good and with so little thought of personal advantage or advancement. Nor has Mr. Hoover's success in administrative work been based on chance and general ability to 'get away with it', but rather on a first-hand knowledge of the conditions with which he has had to deal. Those of us who have been fortunate enough to hear him discuss, or better still to answer inquiries regarding, public questions have been astounded by his grasp of these matters. In the language of the diamond 'he has everything'. Let us have him for President!

The Bryan Campaign Issues

Whatever faults the peerless long-distance runner, Mr. William Jennings Bryan, may have, lack of ability to predict campaign issues is not one of them, even though his ability to get on the right side, or even the winning side, is not quite so great. So, when he states that two of the main issues of the coming campaign will be profiteering and public ownership, the statement deserves attention. While few will dissent from his denunciation of profiteering, that very fact makes it difficult to make much of an issue out of the practice. We all excoriate profiteering in public and wish in private that we could do a little of it. A plank expressing the sentiments of the people on this issue will be a useful thing to have in a party platform, but it will mean about as much as one endorsing the Ten Commandments. When it comes to public ownership, however, Mr. Bryan's advocacy of such a measure will fall a long way short of receiving universal approval. Whatever disadvantages the period of Government operation of the railroads, now happily drawing to a close, may have had, it has had one beneficial effect in curing large numbers of Americans of any lingering desire they may have had for public ownership. When it comes to possible extensions of public ownership to other lines of industry the opposition is even more pronounced. If the Government will keep out of ordinary business activities except insofar as is necessary to ensure everyone an 'even break', we will all be much better off than we are at present, or than we can possibly be under any socialistic or semi-socialistic system.

The Shipyard Strike

Outwardly at least, the general situation in the shipyards and commercial shops in the Bay district and other cities of the Pacific Coast has changed but little during the past month. The shipyards of the Bay district are all operating, but with forces smaller than before the strike and also smaller than could be used. Most of the commercial shops are also working, although with reduced forces, and some shops have not reopened since the strike. The California Metal Trades Association estimates that its member-firms have approximately 18,000 men at work, about half the number employed before the strike. What proportion of this number are former employees and what proportion are new men cannot be determined. It is, however, certain that among the men that originally struck, the proportion of skilled mechanics returning to work is smaller than the proportion of either machine specialists or laborers.

There has been enough violence and intimidation to have considerable effect in keeping down the number of men returning to work. On January 19 the Federal District Court issued an injunction restraining the various unions from picketing or otherwise intimidating employees at the two yards of Bethlehem Shipbuilding Corporation and at the Schaw-Batcher yard at South San Francisco, which already has had a salutary effect.

As a result of coming to an agreement with the Molders' union, the members of the California Foundrymen's Association are finding no difficulty in getting the men they need, but none of the foundries are employing as many men as before the strike. Thus, while the Molders' union may be said to have won their part of the strike, the net result has been a large decrease in the number of jobs available to members of the unions, while those that have jobs will have to work fully two years at the increased scale to make up for their period of enforced idleness.

The shipyards have started their provisional plan for works councils, which is described more completely in another column. On January 21 the Bay District Metal Trades Council addressed a communication to the California Metal Trades Association, proposing a conference with a view to settlement of the strike. This the Association refused to do.

In other Pacific Coast centres conditions vary materially. Throughout the Los Angeles district, open-shop conditions prevail, usually at the Macy scale. An attempt was made by the Boilermakers' union to call a strike at the yard of the Southwestern Shipbuilding Company because the 'West Calera', an 'unfair' ship, was brought there from a Bay District yard for completion, but this proved unsuccessful. In the North-West the lack of uniformity of working conditions, noticeable ever since October 1, has become even more pronounced. Some concerns that closed at that time have reopened under the Macy scale and with the open-shop. Others, which paid the increased wage in the beginning, have completed the contracts on which they were engaged, and have closed down or will do so shortly. Other firms, which paid the raise while they were working on old contracts, have gone back to the old scale on new work, and are facing strikes in consequence. Here and there, a firm is trying to restore the 48-hour week. There is a general tendency to try to obtain open-shop conditions where this can be done without violating existing agreements with the unions.

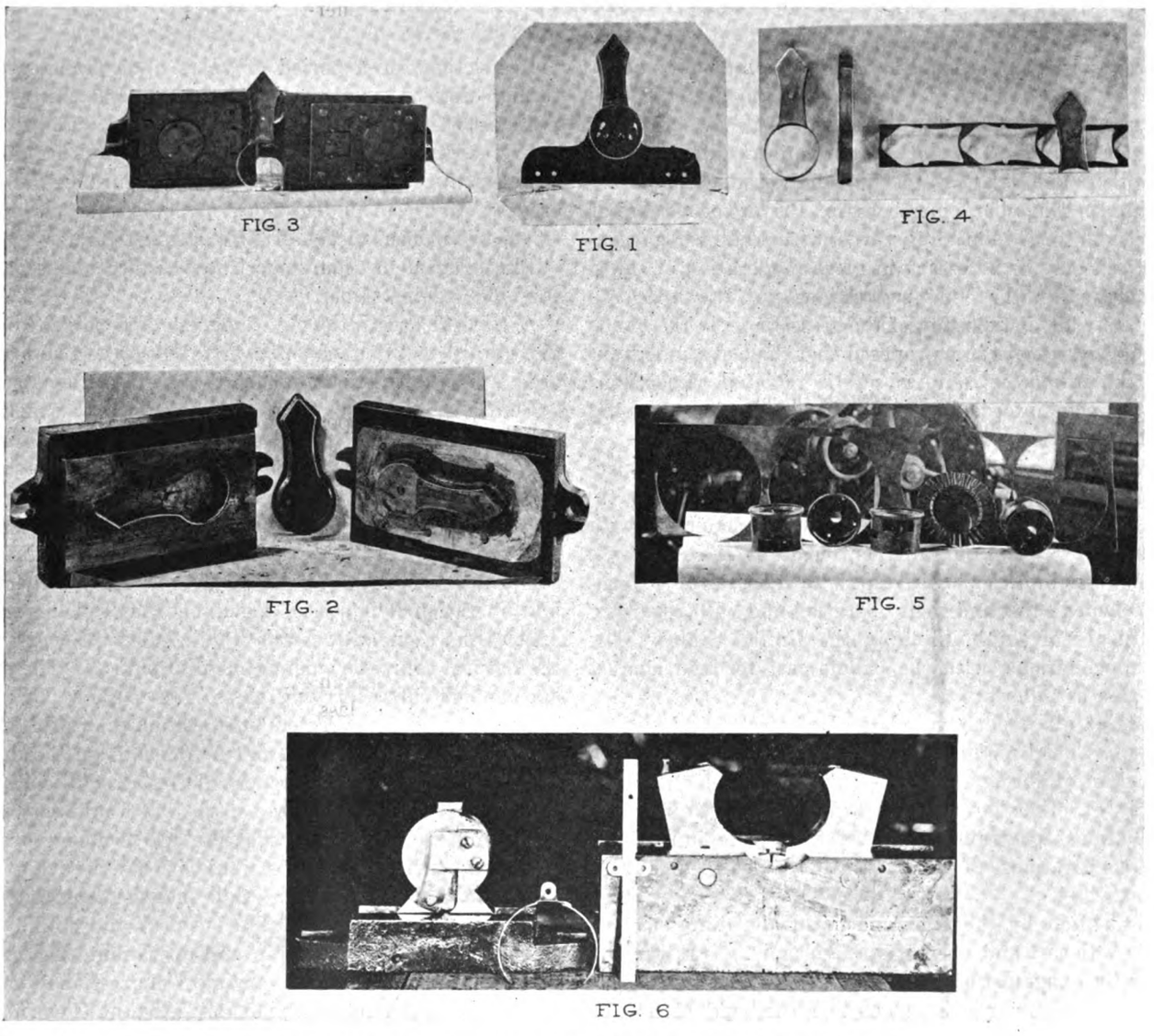
Generated on 2024-09-30 02:10 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Dies and Punches Used in Making an Automobile Signal

THE 'specialty' manufacturer of the Pacific Coast is daily showing the fallacy of the old cry of 'we can't compete with the East'. There are few metal-working concerns in this district that manufacture a greater variety of articles than the American Coin Register Co. This article describes how study of processes and requirements has facilitated economical production.

As has been forcibly impressed upon many of our readers, among the laws regulating motor traffic passed by the California legislature at its last regular session, was one providing that the driver, when stopping or turning to either side, should give certain hand-signals for the benefit of those behind him, and that where the type of the machine was such that these signals could not be given, the machine should be equipped with a signaling device. Among the devices developed by the American Coin Register Co., of Emeryville, to comply with this law is one described in this article.

The device complete is shown in Fig. 1, while the other illustrations show some of the component parts. In the arrow-shaped and the circular frames, are inserted pieces of ruby-colored glass. The remaining parts are punched from steel and from brass sheets. Gilro, Bliss, and Niagara presses are used for the work. The device is designed to be attached to



AUTOMOBILE SIGNAL AND PARTS. FOR DESCRIPTION SEE TEXT

Generated on 2024-09-30 02:06 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

the rear of the car above the number-plate, the mechanism being operated from the driver's seat. When the car is proceding straight ahead, both arrows point upward, one behind the other as is shown in Fig. 1. To indicate a turn to the right, one arrow points to the right. To indicate a turn to the left, the other arrow points to the left. Before stopping both arrows are extended. At night, the arrows and the body holder are illuminated.

In Fig. 2 are shown the punch and dies used for shaping the back part of the arrow, while in the centre is shown the part after drawing. This drawing is done by one blow. The blanks for the arrow are punched in a previous operation from steel sheets 0.032 in. thick. In Fig. 3 are shown the punch and die for punching the circular pieces from the arrow, and in the centre is the arrow itself ready for assembling, the holes for attaching the cover being punched at another operation. These holes are 'coned', or, in other words, the metal, instead of being punched clean, is drawn in a cone shape in order that a sufficient number of threads can be tapped to hold the cover securely.

In Fig. 4 at the lower left-hand corner are shown views of the arrow in two other positions. Next to these is a strip of sheet steel from which blanks for the cover are punched. One of the blanks is shown standing in front of this strip. The central part of these blanks are afterward punched out and the frame nickel-plated.

In Fig. 5 is a brass sheet from which the blanks for the body holder have been punched. One of these blanks just after blanking and first drawing is shown at the right of the centre, while the other four views show different positions of the completed holder. The brass sheets are 0.050 in. thick.

Fig. 6 shows a small clamp that holds the arrow in its various positions. The blank for the clamp is shown leaning against the die. Bending the main strip into a circular form and bending over the two small projections is done at one operation by the punch and die shown.

Proposed Merchant Marine Policy

Proposals for a national merchant marine policy advocated by the Chamber of Commerce of the United States as a result of a referendum just completed have been laid before Congress. The referendum vote was taken among more than 1200 trade and commercial organizations comprising the Chamber's membership. Private ownership of vessels and of shipbuilding yards, with whatever government aid may be necessary in private operation of ships, is included in the chief suggestions put forward. To secure a wide distribution of the vessels now in the hands of the Government it is proposed that the Government invite the formation of quasi-public regional associations to act in an intermediary capacity in placing shipping in the hands of corporations and individuals.

The membership of the Chamber voted on nine proposals as advanced by its committee on ocean transportation. These proposals were made by the committee with a view to ascertaining the sentiment of the country's commercial interests with respect to disposal of government-owned ships and their operation and with regard to the future of shipbuilding in the United States. The recommendations, with the ballots cast for and against each, are as follows:

Sale of all wooden vessels and of steel vessels under 6000 tons deadweight on the best terms obtainable from American or foreign bidders—for 1235; against 235.

Sale of other government-owned vessels to regional associations for transfer at cost to private individuals and corporations of the several regions—for 1200½; against 244½.

Absorption by the Government of the difference between war cost and present value of ships, as a war loss —for 1394; against 61.

Freedom from regulation as to routes and rates—for 1369; against 84.

Restriction for a period of years upon transfer to a foreign flag of steel vessels over 6000 tons deadweight purchased from the Government—for 1337; against 121.

Preference for American underwriters and use of the underwriting market of the world for insurance not covered by American underwriters, without intervention by Government insurance—for 1374; against 73.

Encouragement of an American classification society—for 1408; against 44.

A general declaration by Congress of a policy to give aid toward maintenance of a privately owned and operated American merchant marine—for 1373; against 93.

Continuance of operation of the competent American shipbuilding yards, on private account, both as to the yards and the vessels they construct—for 1413; against 42.

In support of its position that the Government should not own and operate the country's merchant marine the committee declared that under Government ownership and operation it is almost inevitable that considerations apart from economic reasons would interrupt constantly the natural courses of management of ships. "The management of cargo-carrying ships," says the report, "is one of the most complicated businesses in the world * * * and a successful merchant marine depends on the development of a large class of energetic resourceful shipping men * * * all animated by a spirit that would not be expected of Government employees. Government ownership and operation of ships would be destructive of the initiative and flexibility in ship management that are essential to the success of the business and would cost more than private ownership and operation. Again the uncertainties created by varying Congressional action would result detrimentally to any attempt Government officials might make to establish policies." The objec-

Generated on 2024-09-30 02:08 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

tions to government-owned and operated ships apply, the committee points out, with only a little less force to privately operated government-owned ships.

In proposing the creation of regional associations to represent the various maritime sections of the country in disposing of ships over 6000 tons the committee suggests that they be formed at the prompting of the Government and developed under encouragement of local, State, and city authorities, chambers of commerce, and other similar organizations. These associations would assist corporations and individuals, when necessary, in procuring capital with which to purchase vessels. The committee suggests that terms of sale should be made liberal to encourage purchasers.

It is proposed tentatively that regions might be formed as follows:

One to represent New England.

One to represent Philadelphia and adjacent territory.

One to represent Baltimore and adjacent ports, including Hampton Roads.

One to represent South Atlantic ports, centring possibly at Charleston.

One to represent New Orleans and the Gulf ports.

One or more associations on the Pacific Coast, probably at San Francisco and some Puget Sound port.

One or more associations on the Great Lakes.

Explaining the proposal that the Government take the loss between war cost and present market valuation the committee points out that it is only a book-keeping loss, in that the Government has suffered the loss already whether the ships are sold or not. "The ships in the hands of the Government," says the committee, "will be worth no more than they would be to private ship-companies and if the Government retains and operates them the ships will be put into operation in competition with foreign lines, capitalized at a lower value, and the rates on Government ships would have to be determined by world market values, not by their original cost to the Government."

Freedom from Government regulation as to routes and rates, except insofar as such regulations already exist, is desirable, the committee declares, and it calls attention to provisions of laws now in force. Respecting Government aid in the operation of ships the committee believes the public understands the necessity of maintaining a merchant marine and is willing to tax itself for the purpose. After present contracts are completed or adjusted, the Government, in the opinion of the committee, should retire from the shipbuilding business except insofar as naval vessels are concerned. "There remains the question," says the committee, "whether the shipyards will be able to build ships without some form of Government assistance. Precisely in what form Government aid should be extended may not at the moment be possible to determine. If the ship-operator receives sufficient aid to permit of his conducting his business at a profit, and if Americans will willingly, or permit themselves to be compelled to, build their ships in American yards, the shipbuilder, who deserves to survive in open competition, will probably neither require nor demand any further aid."

The Committee on Ocean Transportation is composed of the following: Edward B. Burling, chairman, John F. Deems, M. E. Farr, Homer L. Ferguson, C. F. Gregory, B. F. Harris, Charles H. Jones, F. J. Koster, A. H. Mack, N. Sumner Myrick, J. H. Thomas, S. W. Weis, and E. W. West.

Foundry Organizations in Germany Unite

The Verein Deutscher Eisengiessereien in its general meeting, held recently at Dusseldorf, has announced the fusion of the foundry syndicate Giessereiverband with the Germany Foundry union, which now counts a thousand adherents.

The foundry industry of Germany will thus be represented by a single economic organization. The union proposes to aid the foundries not only by the labors of its central trade committee but by the activities of a technical council.

A memorial of Alfred Seidel, Chemnitz, establishes the basis of a system which shall give a definite coefficient or formula for computing overhead charges tending to lead to price uniformity, a feature hitherto lacking among the scattered foundry elements of Germany.—'Iron Trade Review'.

THE night that peace was signed was a big occasion in Paris, and celebrated as only the French know how to celebrate. Everyone was kissing everyone else, and confetti and fireworks were everywhere. Around midnight as I was returning to my hotel I passed the Place de l'Opera. Coming toward me was a large doughboy, about six feet three. Each arm embraced a good looking madamoiselle, and he was impartially distributing kisses between them. As I came near he recognized that I was an officer, and straightened up. He kissed first one and then the other, and regarding me with a smile said, "Look lieutenant, they drafted me for this!"—'Los Angeles Times'.

THEY met at a dance. He was tall and stalwart, she—oh, so sweet.

They jazzed, they one-hopped, they two-whirled, they—well, they did just what everybody's doing now.

After the seventh dance with his charmer the young fellow stopped suddenly and glanced suspiciously round.

"It's funny, Mabel," he said. "See the glum-looking chap over there. He's been following us about all the time. Who is he and what's he after?"

"Who—that miserable, half-starved fellow in the spotted red tie?" remarked Mabel, casually. "Don't worry about him; he's only the fellow who paid for me to come in."— London Answers.

Generated on 2024-09-30 02:09 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Manufacture of Semi-Steel Castings

In a paper presented at a meeting of the American Institute of Mining and Metallurgical Engineers, Frank E. Hall, director of laboratories for the American Radiator Co., called attention to the fact that it is possible to double the strength of ordinary cast-iron by the addition of steel scrap and the proper manipulation of the controlling constituents. Ordinarily about 3% of graphitic carbon is present in cast-iron, but as the specific gravity of graphite is 2.15 and of cast-iron 7.20, the space occupied by the graphite is upward of 10%, so when it is considered that the graphite is present in flakes, or plates, and not in grains, the reduction in strength is easily understood. The production of semi-steel involves a reduction of graphitic carbon to approximately 2.40%. In addition, the reduced silicon content and other factors entering into the situation tend to change the flakes of graphite into finer particles of more compact shape, rendering the structure more homogeneous and, consequently, stronger.

A number of features are of prime importance in securing consistent results. Foremost among them are the control of the chemical composition of the metal and care in maintaining the proper melting-conditions as well as the conditions surrounding the pouring and subsequent heat treatment of the castings. As increased strength is the main object sought, the carbon and silicon must be reduced. The extent to which this reduction may be carried is limited by the size of the casting, the material of which the mold consists, the subsequent heat treatment, and, to some extent, by the percentage of sulphur and manganese contained. The lower the total carbon, the greater is the tendency of the carbon to remain in the combined state for any given silicon content; so in order to safeguard the castings from 'chilling white' it is necessary to increase silicon as the total carbon decreases. A generally accepted rule is that for castings 6 in. diam. or larger, the total carbon plus the silicon should be maintained at approximately 4.40%, although excellent results have been secured with a total considerably below this figure.

Control of the chemical composition of the metal and care in maintaining proper melting-conditions are of prime importance in the manufacture of semi-steel castings.

The total carbon is more difficult to control than is the silicon, for in the cupola, carbon is absorbed from the fuel in varying amounts, depending on the conditions surrounding the melting. As a result the total carbon is always greater than the calculated amount, and it is not always possible to forecast accurately the reduction that will be obtained from the use of a given amount of steel scrap. The silicon, on the other hand, loses more through oxidation than is the case in melting ordinary gray iron; and while a better control of the silicon content is possible than of the carbon, the variations are such that accurate and rapid laboratory methods are imperative in order that as close control as possible may be maintained.

As carbon is absorbed from the fuel, the total is always greater than the calculated amount.

A phosphorus content not to exceed 0.12% is desirable. The effect of manganese is practically the same as with ordinary gray iron and, as in the case of other low-silicon castings, is preferably carried from 0.75 to 1%. Sulphur, never a desirable constituent, tends for various reasons to increase abnormally in semi-steel. Chief among these is the ready absorption of this element by the steel scrap, which necessarily consists of moderate-sized pieces. As these become red hot before the larger pieces of pig-iron and require greater heat to melt, they remain longer in contact with the sulphurous gases from the fuel. As the latter is required in greater amount in order to ensure the proper melting of the steel scrap, it naturally furnishes more sulphur. Special care is needed in the selection of materials and attention to the details of the process to ensure as low a proportion of sulphur as possible.

Tests show that in general increased toughness accompanies the increased tensile strength. There is a limit beyond which the tensile strength cannot be carried, however, for when the total carbon and silicon content falls much below 4.4%, the semi-steel becomes difficult to melt and is sluggish in the molds, so that slag and gases do not readily free themselves and defective castings are obtained. The total of carbon and silicon content below which it is unsafe to go is probably in the neighborhood of 4%. It would not be wise to continue at this point for many heats in succession as, in addition to the danger to sluggish metal, there is danger of its 'chilling white' unless carefully cooled. The best results are obtained between 4 and 4.4%, with the total carbon as near 3% as possible and the combined carbon at or near 0.6%.

Second only in importance to chemical control is the cupola practice, as it is easy to spoil an otherwise perfect mixture for semi-steel, by lack of attention to details in melting. It is of the utmost importance that the coke-bed be thoroughly ignited and leveled and that the charges be placed with the utmost care to maintain compactness and uniformity and a proper division between the coke and metal layers; the cupola should be kept filled to the charging-door.

As the material composing the charges for semi-steel has a greater tendency to oxidation, it is important that careful attention be paid to the fluxing of the cupola. Limestone used alone is satisfactory, provided the heats are not more than 5 hr. in duration. It should

Careful attention must be paid to the fluxing of the cupola.

Generated on 2024-09-30 02:11 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

be from 7 to 10% of the weight of the metal charge. A good depth of slag should be carried above the metal to admit of the thorough cleaning of the molten metal as it drips through this blanket of slag. For heats longer than 5 hr., it is advisable to substitute fluorspar for a portion of the limestone. From 15 to 20% of the weight of the limestone may be replaced satisfactorily by fluorspar on heats up to 10 hr. duration. It should be borne in mind, however, that fluorspar has about double the fluxing capacity of limestone, so that for every pound of fluorspar two pounds of limestone should be deducted.

It has been found satisfactory to place the charge of flux directly upon the coke. The steel, having a higher melting point than pig-iron, should be charged immediately after the limestone, and it should be followed, in turn, by the pig-iron and the re-melt. The metal charge should be carefully leveled by filling the smaller pieces of the re-melt into the crevices left in placing the pig-iron.

More coke will be used in melting semi-steel than in good gray-iron practice, as the semi-steel must come from the cupola extremely hot. Having a much lower carbon content, semi-steel freezes at a higher temperature, and therefore needs to be handled at a higher temperature than gray iron. For the same reason, it should be handled rapidly and in large ladles to prevent too great a fall in temperature.

The great variation in composition, between the steel-scrap used and the balance of the charge, necessitates a thorough mixing of the metal before pouring. To this end, it is advisable to make the charges as small as is consistent with pronounced separation of the layers of coke and metal in the cupola. This feature is also governed, to some extent, by the ability of the charging-gang to maintain proper charging conditions. The smaller the charge, the greater is the difficulty in keeping the materials properly placed and the cupola full, so that it may become necessary to use slightly larger charges than would otherwise be desirable for the sake of maintaining the best charging conditions, especially in the case of heats of long duration. A cupola lined to 66 in. operated very successfully on a 2000-lb. metal charge so long as the heats were of short duration but when the time was increased materially, it was found necessary to double the charge, using 4000 lb. of metal. In order to maintain proper mixing of the metal, a large mixing-ladle is advisable, as well as large pouring-ladles when as heavy a charge as the above is maintained.

To ensure thorough mixing, it is advisable to make the charges as small as is consistent with pronounced separation of the layers of coke and metal.

Good melting-practice for semi-steel demands coke of good quality and a bed-charge approximately 36 in. above the top of the highest tuyere-opening; and coke charges between the charges of metal of from 1:8 to 1:7.

Owing to the inferiority of the first metal drawn from the cupola, it is advisable to pig the first ton or two of metal melted. The inferiority of this metal can probably be attributed to several causes; among these are the greater oxidation, giving a low and uncertain manganese and silicon content and the tendency of the gray iron to melt ahead of the steel. It is, therefore, advisable to make separate analyses of the first metal, which is pigged for re-melt, and to treat it as a separate constituent in calculating the mixtures. In order to render the variation in this first metal as small as possible, small steel-scrap should be used on the first charge in order that it may melt as nearly as possible at the same time as the gray iron.

After the first ton or two of metal has been tapped into the mixing-ladle, the cupola should be plugged and the ladle drained so that the subsequent metal will not be contaminated with the first metal drawn. When the metal is again tapped, it may be allowed to run continuously and the molten metal drawn from the mixing-ladle into the pouring-ladles as required.

The blast should be maintained at a uniform volume and of sufficient quantity and pressure to penetrate to the centre of the melting-zone. For a cupola lined to 66 in. a pressure of 14 to 16 oz. is satisfactory. In handling semi-steel during and after pouring, standard foundry practice for gray iron should be followed.

Ball-Bearings in Steamship-Engines

By WALTER H. SHOLES

The Swedish ball-bearing manufacturers, after introducing successfully ball-bearings in Swedish rolling-stock, especially the Swedish State railways, are now making further experiments which have for their object the introduction of the ball-bearing principle in ship construction, especially for propeller-shafting. The problem is the construction of a bearing able to withstand all axial pressure from the propeller and to exclude all possibilities of hot box and kindred troubles. The successful ball-bearing, it is claimed, must under the most trying conditions be able to withstand the axial pressure automatically and require little or no attention and must be of such simple and reliable construction that friction within the same is at a minimum and that the ship's movements may not influence disadvantageously the ball-bearing mechanism. The bearings hitherto used have proved unsatisfactory in these respects, it is said.

VILLERS and a young lady were conversing on an ocean-pier while the bathers down below sported in the breakers or idly strolled the beach. Suddenly the young lady said:

"Doesn't that skinny bather look like Helen Gray?"

Villers nodded.

"She sure does," he said, "but I wouldn't call her bathing-suit gray. It's blue."

Generated on 2024-09-30 02:07 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Reconstruction of the Marchant Calculating Machine Company's Plant

The plant of the Marchant Calculating Machine Co. was severely damaged by fire during the early morning hours of November 29. The dies in the die-vault were undamaged, but all machine tools were injured to some

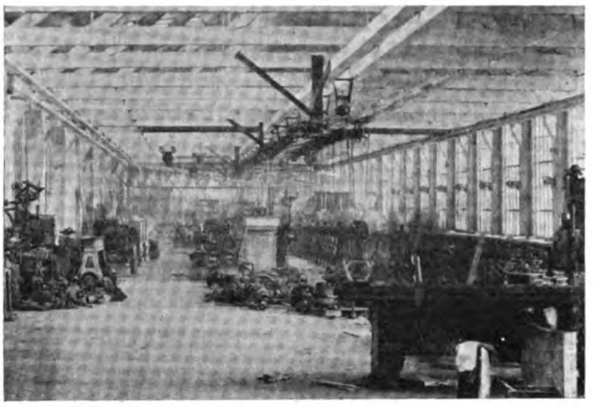


FIG. 1. PART OF MAIN BUILDING SIX WEEKS AFTER FIRE. CINCINNATI PLANER IN FOREGROUND. COMPARE WITH PHOTOGRAPHS ON PAGE 60.

extent by the fire, which destroyed the wooden roof, floor, and other combustible material, leaving only the concrete walls standing. Before the ashes were cold, the company's forces started on the work of reconstruction.

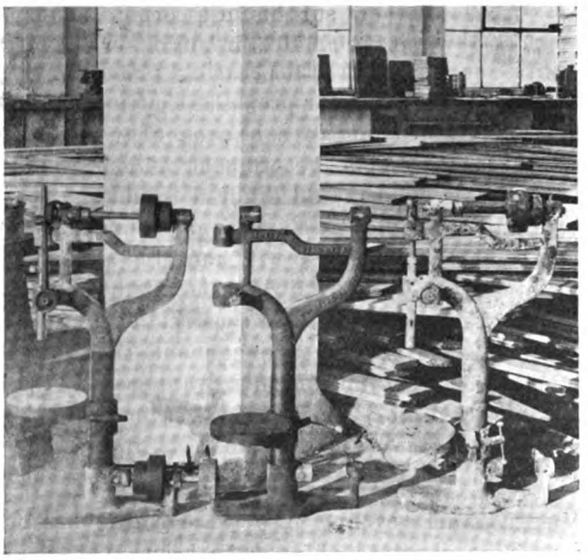


FIG. 2. STAGES IN THE REPAIR OF DRILL-PRESSES

Temporary sheds were built, and the machinery moved into them as rapidly as possible in order to prevent damage from rusting.

Examination of the machine-tools disclosed that the fire had been hot enough to melt out all bearings. Lathes were found to have platens warped $\frac{1}{32}$ in. or more. Drill-presses also had suffered considerably, both tables and spindles and in some cases the entire frame of the machine being warped. Outside of melted bearings comparatively little damage was done to the punch-presses. Line-shafting was so badly damaged as to have only a scrap value.

Fortunately a 36-in. Cincinnati planer was found to be

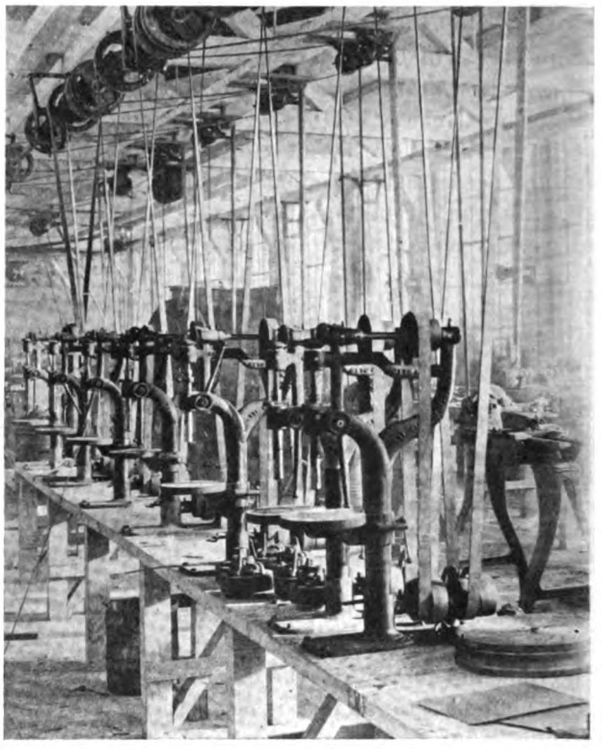


FIG. 3. BATTERY OF DRILL-PRESSES REPAIRED AND READY FOR WORK

in fair condition. It was speedily repaired and placed in a temporary shed protected from the weather. It was then put to work on getting the lathes back into condition. All the lathes are relatively small so that they could easily be handled on this planer. As soon as some lathes were repaired, these were set to work on drill-press spindles and similar work.

Fig. 2 shows three stages in the repair of a number of small drill-presses, of which there were about twenty in the shop. When these presses were first taken from the ruins, it looked as though they might just as well be sent right over to the foundry to be broken up for scrap. However, two men were set to work on rehabilitating the presses, and they turned out an average of two per day. Even with a liberal allowance for overhead, this is only a

Generated on 2024-09-30 02:05 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

fraction of the cost of replacing the presses with new machines irrespective of the question of deliveries. Fig. 3 shows a battery of these repaired presses set up and ready for work. Larger presses were similarly repaired.

Practically all the work was done with company forces and with company equipment, about 50 machinists and helpers being employed on the work. Meanwhile reconstruction of the buildings themselves was being rushed by the carpenters. The accompanying photographs, taken on January 15, give an idea of the progress in reconstruction of both plant and machinery on that date. It is expected that the plant will be back on a manufacturing basis about February 1, or within 60 days of the time of the fire.

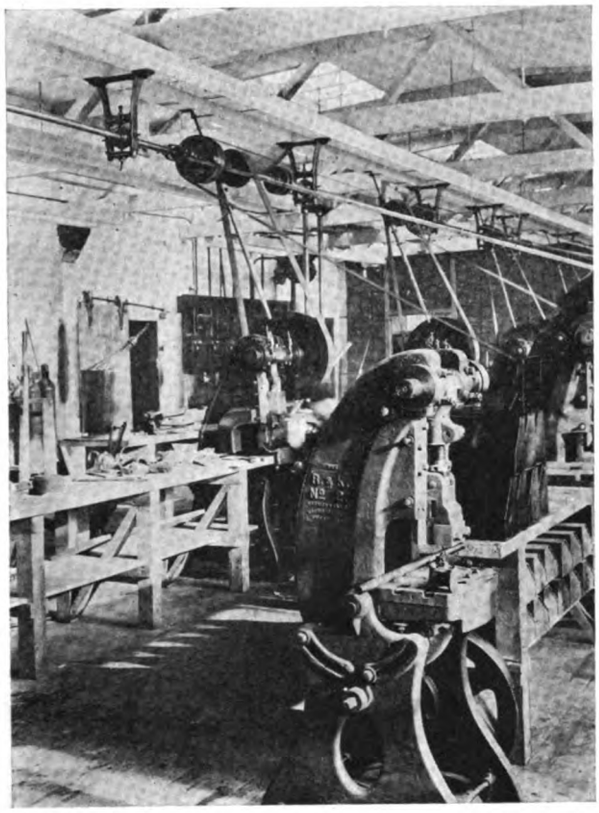


FIG. 4. PUNCH-PRESSES REPAIRED AND OPERATING

Acknowledgment should be made to A. Carlsen, foreman for the company and in direct charge of this part of the work of reconstructing the plant, for assistance in preparing this article.

The Edge Bill for Facilitating Foreign Credits

On December 24, the President approved the Edge bill, providing for the Federal incorporation of institutions organized for carrying on international and foreign banking and other financial operations. While the most important direct effect of the bill will be facilitating the extension of credit to buyers in European countries where the trade balance now affects trade with America unfavorably, trade with other countries as well should be stimulated. The bill is an amendment of the Federal Reserve Act, and is given in full in U. S. Commerce Reports for January 9, issued by the Bureau of Foreign and Domestic Commerce. A summary of the more important provisions is given below:

Regulations are given for the organization of corporations to engage in banking and other financial operations in foreign countries or in the United States dependencies and insular possessions. Such corporations are to be under the general control of the Federal Reserve Board. They may receive deposits outside of the United States and shall receive only such deposits within the United States as may be incidental to or for the purpose of carrying out transactions outside the United States. They may not engage in ordinary commerce or trade in commodities, nor may they attempt to control the price of commodities.

The minimum capitalization of such corporations is to be $2,000,000, at least one-fourth of which must be paid in before business is commenced, and the remainder within a few months thereafter. Capital stock may be reduced or increased by vote of the stockholders and with the approval of the Federal Reserve Board, except that it may not be reduced below $2,000,000. Any national banking association may invest in the stock of such corporations, but the aggregate holdings of any subscribing bank of such stock shall not exceed 10% of its own capital and surplus. A majority of shares of any such corporations must always be held by citizens of the United States or by firms or companies controlled by citizens. No corporation organized under this act shall invest more than 15% of its capital and surplus in a corporation engaged in banking nor more than 10% in any other corporation. No such corporation shall hold stock in another corporation with which it is in substantial competition. The above restrictions, however, shall not be construed to prevent such a corporation from acquiring stock in another corporation in order to prevent a loss upon a debt previously contracted in good faith, but such stock must be sold within six months unless an extension is granted by the Federal Reserve Board.

Other sections of the bill provide means for the conversion of banking institutions now principally engaged in foreign business into corporations under the bill, for the rendering of reports on a corporation's business to the Federal Reserve Board, for the voluntary liquidation of a corporation, and for the forfeiture of a franchise by a corporation that fails to comply with the provisions of the bill. In general, a corporation organized under this bill may occupy a similar position in foreign trade that a bank under the Federal Reserve Board does in domestic trade, and we may expect that the organization of such corporations will ultimately have a similar stabilizing effect on our foreign trade that the passage of the original Federal Reserve Act had upon domestic conditions.

Generated on 2024-09-30 02:06 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

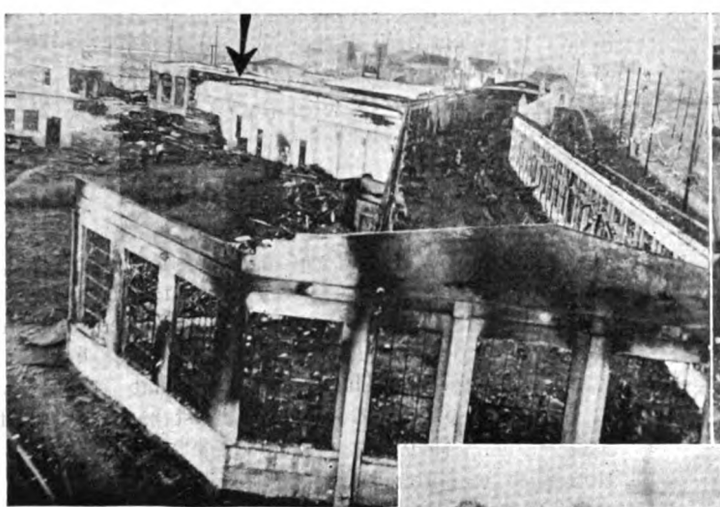
Some Lessons of the Marchant Fire

By THOMAS H. LARKE, Jr.

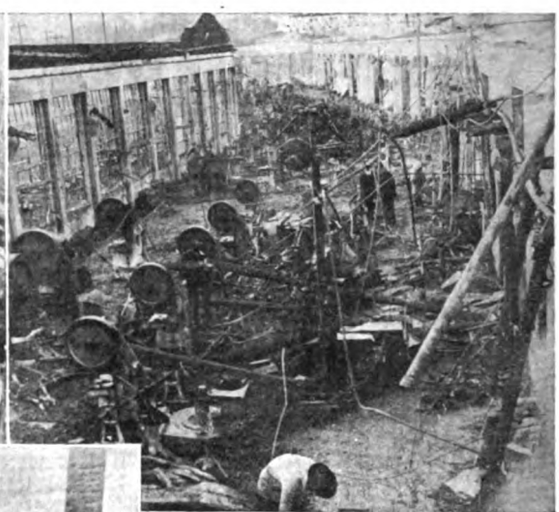
THE Marchant plant was far above the average metal-working plant from the standpoint of fire-resistive construction. Yet it burned. Most proprietors of metal-trades plants that are housed in combustible structures cannot afford to replace these with fire-resistive buildings, but they alco cannot afford to neglect to take the measures for preventing and controlling fires described in this article. Mr. Larke is an inspector for the Fire Prevention Bureau of the Pacific.

Fire practically destroyed the plant of the Marchant Calculating Machine Co. at Emeryville, California, in the early morning of November 29, 1919. The watchman stated that in making his rounds at about two o'clock in the morning he discovered fire in the wooden roof-trusses above a gas-heater suspended from the ceiling. After endeavoring to extinguish the flames with a stream from an inside hose-rack, and failing to gain control of it, he notified the Oakland Fire Department, which in turn relayed the alarm back to the Emeryville Fire Department. In the meantime the fire had spread, and by the time the first firemen arrived, a large part of the plant was involved. Several companies were sent from Oakland to assist, and the fire was finally extinguished after burning over three hours. The foundry, which was detached from the rest of the plant, and the office-section of the main building, were saved.

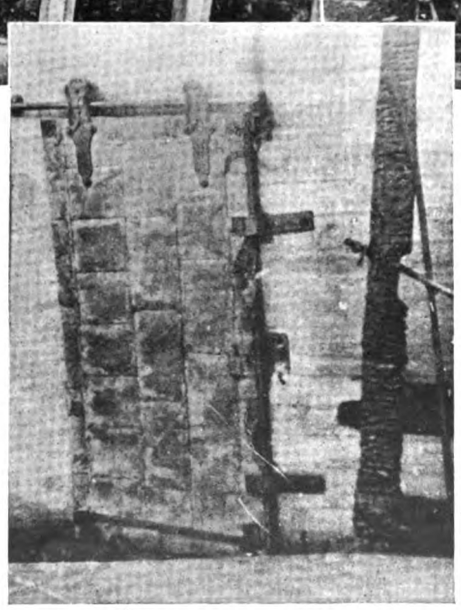
The main building, which was almost entirely destroyed, was a one-story joisted reinforced concrete structure, with cement floor and frame roof supported on wood trusses. The windows were plain glass in metal frames. The plant was built in 1918 for the manufacture of calculating machines. It covered an area of approximately 30,000 sq. ft. and consisted of one long building and several wings. Near the centre of the building was a 65-ft. frame tower, and adjoining the base of the tower was a concrete vault for the storage of dies and plans, the doorway to which was protected by a standard automatic tin-clad door.



GENERAL VIEW OF THE PLANT ON THE MORNING OF NOVEMBER 29. ARROW SHOWS WHERE FIRE STARTED



PART OF MAIN BUILDING SHOWING DAMAGE TO MACHINERY FROM FALLING OF BURNING ROOF



THIS FIRE-DOOR PROTECTED FROM DAMAGE $60,000 WORTH OF DIES AND JIGS STORED IN THE VAULT BEHIND IT

The fire, starting near the centre of one of the wings, as shown in the accompanying photograph, spread to the tower and along the wooden truss-roof to all parts of the main building, there being nothing in the way of fire-stops to prevent its doing so. As the water-mains in the vicinity are but four-inch, the firemen were unable to secure more than one good stream from this source, although another good stream was

Generated on 2024-09-30 02:08 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

obtained from the private fire-system of the Paraffine Paint Co., a block away.

After burning for perhaps three-quarters of an hour, the roof of the wing in which the fire originated fell, and continued to burn among the machinery. This collapse continued until it covered all the manufacturing portion of the plant, the timbers simply burning themselves out. The heat was so great in some places that it melted the glass from the metal sash. Water-pipes, shafting, and various parts of the machines were badly twisted and warped. The damage has been estimated at $165,000. Valuable dies stored in the concrete vault behind the tin-clad fire-doors were not damaged, thus adding to the long list of testimony to the efficiency of this kind of protection.

Although the heat of the fire was so great that glass was melted from the metal sash, dies stored in the concrete vault behind a tin-clad fire-door were not damaged.

In an occupancy of this class, where the contents are for the most part incombustible, it is only natural to assume that a building of strictly fire-resistive construction would be a needless expense, there being little possibility of a fire in the building of sufficient intensity to injure the unprotected incombustible structural portions. For the most part the processes carried on are not hazardous and the fire record of this class of occupancy has been good. However, no matter how slight the fire hazard may seem, as in the case of the Marchant plant, it has been forcibly and clearly demonstrated all over the United States that so long as there is combustible material in a building, either in its structural parts or in the contents, that material will burn if the proper conditions arise. These conditions differ with the construction of the buildings and the occupancy.

As long as there is combustible matter in a building, either in its structural parts or in the contents, that material will burn if the proper conditions arise.

In the Marchant plant the conditions were: A combustible roof; a gas heater, defective in either design, installation, or use; a watchman, who either was not properly instructed, or else disregarded those instructions; and insufficient public fire-protection.

Probably these conditions all existed since the plant was built, just as they now exist in many other plants on the Pacific Coast. Why the fire did not start in the Marchant plant before is not easily explained, and why many other plants do not burn is also somewhat of a mystery to those who have studied the conditions existing in many of them.

There is only one positive way to prevent a fire in a plant, and that is, to keep out everything that will burn. In metal-working plants, insofar as the contents are concerned, there is generally nothing to burn except wooden work-benches, furniture, and the workmen's overalls. For this reason such plants are said to have a comparatively slight fire hazard as a class.

It follows that the metal worker has only to place his equipment in a building that will not burn in order to reduce to the minimum his chances of having a fire. If the roof of the Marchant plant had been of, say, concrete or corrugated-iron construction, supported by steel trusses, there would have been no fire. As a whole, a metal-working plant such as the Marchant factory, in a building constructed of incombustible materials, and with good care and cleanliness, should feel reasonably secure from a fire of any consequence.

If the roof of the building had been of concrete or corrugated-iron construction supported by steel trusses, there would have been no fire.

However, the great majority of metal-working plants are not in buildings that will not burn, but the contrary is the case. What precautions should be taken to prevent fires in this class of plant? It must be remembered that a frame building, or a brick building with wooden floors and roof will burn readily after a fire has once started, no matter what the occupancy, and the problem is to prevent its starting, or to prevent its spread if once started.

Since most metal-working plants are housed in buildings that will burn no matter what the occupancy, the problem is to prevent the starting of a fire, or to prevent its spread if once started.

It is not the purpose of this paper to describe all the causes of fires in metal-working plants. The fire in the Marchant plant was caused by a gas-heater being placed too close to wooden-roof trusses. It was probably far enough away to be safe under ordinary circumstances, but when it became overheated in some manner, the trusses started to burn. It was thought to be safe when installed, and possibly the most experienced insurance inspector would not have objected to these heaters as they were installed. The fact remains that the fire started, and it follows that provision must be made for the prompt extinguishing, or confining of a fire when once started, in spite of all precautions taken.

The automatic sprinkler, in conjunction with good watchman service, is the best all-around fire-protection yet devised. When the fire becomes hot enough to heat the air around the sprinkler-head to about 165°F., the head 'breaks' and a heavy spray of water is thrown on the fire. At the same time an inside alarm is automatically sounded, and the watchman, after turning in the alarm to the fire department, investigates. If the fire is out, he turns off the water; if not, he goes into action with the inside fire-hose or hastens to direct the firemen to the fire. Usually the sprinklers either put the fire out or hold it until the arrival of the fire department. Even where some work is left for the department to do, the total damage is small compared to what might have occurred had there been no sprinkling-system in the building.

The automatic sprinkler, in conjunction with good watchman service, is the best all-around fire-protection yet devised.

Sufficient attention is seldom given to the selection of

Generated on 2024-09-30 02:06 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

a watchman. A good watchman must be intelligent, and physically able to fight a fire. His instructions must be absolute: "In case of fire, turn in the alarm to the fire department FIRST, then try to put out the fire yourself." It goes without saying that he should know how to turn in an alarm, but the manager of the plant should make sure of this. He should be required to visit all parts of the plant at least once an hour during nights and holidays, and a check should be kept by means of an approved portable clock or a central-station service.

A watchman should be intelligent and physically able to fight a fire. He should be instructed to turn in an alarm first, and then to fight the fire himself.

Parts of the plant where any hazardous processes are carried on should be cut off by means of brick or concrete fire-walls with the openings protected by double automatic approved fire-doors, and no plant of any size should be without at least one fire-division to prevent its being destroyed in its entirety. Hose-racks, each with 50 ft. of fire-hose, should be so distributed that a fire-stream could reach any portion of the plant.

Recently in Alameda, California, the principal water-main supplying the city with water for fire-protection was broken. Several hours later, a fire started in a frame building and before sufficient water could be obtained, an area equal to an entire city block was completely burned. A private gravity-tank, elevated sufficiently to give good working-pressure for fire-streams, is a most important part of the fire protection for any plant. Various types of chemical extinguishers all have their place, and are excellent first aid for extinguishing fires in their incipient stage, but the plant owner or manager who depends entirely on these agencies may be badly disappointed in case of a fire of any magnitude where good water streams are required. The less reliable the public protection is, the more care should be taken to provide private protection that can control absolutely any fire in the plant.

The less reliable the public protection is, the more care should be taken to provide private protection that can control absolutely any fire in the plant.

Good construction is the best fire preventive. Where good construction is not present, recourse must be had to various protective measures. These vary in their efficiency and must be properly installed and placed, to do the most good. The Fire Prevention Bureau of the Pacific is at all times ready and willing to supply to the owners and managers of plants without cost the experience of its engineers and surveyors in suggesting methods of reducing the fire hazards in their plants.

"Do you think it will help matters to change the name of wood alcohol?"

"I dunno," answered Uncle Bill Bottletop. "A rogue sometimes does his best work under an alias."—'Washington Star'.

New Regulations Prescribing Working Conditions of Women and Minors in California

The Industrial Welfare Commission of California has issued Order No. 13 effective February 17, and affecting all manufacturing plants where women and minors are employed. Exemptions may be granted at the judgment of the Commission, but applications for such exemption must be made to the Commission. The complete text of Order No. 13 has been published in several newspapers, or may be obtained at the offices of the Commission, 525 Market street, San Francisco.

The Order comprises 26 sections. Section No. 1, with regard to lighting, simply provides for the observance of the General Safety Lighting Orders issued by the Industrial Accident Commission. Section No. 2 provides for adequate ventilation, and for the regulation of temperature between certain limits where conditions make it feasible and for the moderation of extreme temperatures as much as possible where the nature of the process employed requires heat. Section No. 3 provides that floors must be clean and well-drained and be constructed so that this is possible. Sections No. 4 to 16 specify the extent, type, and maintenance of toilet facilities. Section No. 17 provides for sanitary drinking-fountains or for the use of individual cups. Sections 18 and 19 specify the number and general character of wash-room facilities that must be provided. Section No. 20 provides for rest-rooms and first-aid equipment. Section No. 21 fixes 45 minutes as the minimum time to be allowed for the noon-day meal. Section No. 22 specifies that rooms for eating lunch shall be provided where the number of women workers is 20 or more. Section No. 23 makes provisions regarding seats for women workers. Section No. 24 states that no woman shall be permitted to lift or carry any excessive burden. Section No. 25 relates to fire-exits and No. 26 to elevator service. In general it might be said that the Order makes no unreasonable demands. In fact, while many of the provisions cover points that used to be ignored entirely, and might now easily be unintentionally overlooked, the requirements prescribed are such as are being observed by progressive firms not only for their women workers, but, with a few minor exceptions, for their men employees as well.

RUMANIA offers a fertile field for the automobile salesmen, according to a Red Cross representative who recently made an economic survey of that country. Business men there have found much to admire in American ways of doing things and of getting results in a hurry. The one hundred fifty odd automobiles and trucks used by the Red Cross have served to introduce American mechanical products to Rumanians. These cars will be sold directly to the Rumanian government upon completion of Red Cross work there, but there will still be a great market for cars of all prices.

Generated on 2024-09-30 02:07 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Oxy-Acetylene Welding and Cutting*

By HUGH H. DYAR†

As the name implies, two gases, acetylene and oxygen, are used. The pressure in the oxygen-cylinders when they are full is 1800 lb.; this is brought in the reducing-valve to the pressure used in the torch, which varies according to the work. On some small jobs we only use a few pounds pressure; on cutting heavy armor plate 18 or 20 in. thick, the oxygen-pressure will be 125 to 150 lb. The acetylene-pressure never exceeds 10 lb., the average is about 7 lb. We have found that at those pressures if the holes are drilled properly we get a proper flame of correct velocity. I have seen a good many torches with the flame so fierce that if a light welding-stick were used it would be blown away, and you could not get results. I have seen some torches where the velocity was so low it would not get down into the metal at all; it would simply burn.

The plant for welding and cutting consists of an acetylene-generator, the oxygen-supply in tanks, the regulating and reducing valves, and the torch or burner that actually does the work, which is connected to the regulators by pliable rubber hose. For portable work the acetylene may be compressed in tanks, filled with a substance which is a good deal like mineral wool, and which holds acetone in suspension. Acetone is a chemical which has the property of holding in solution 25 times its own volume of acetylene for every atmosphere that the gas is compressed. If the acetylene were not dissolved in acetone it would be explosive at high pressure.

In this country there are two basic methods of uniting the gases in the torch. The one first developed and still used by some manufacturers is known as the low-pressure system, in which the acetylene is supplied at a low pressure, three or four ounces, and drawn into the flame by the oxygen under high pressure a good deal on the principle of a steam-boiler injector. The probable reason for the use of this method is that, when the art was new, acetylene was procurable only from low-pressure generators. The power used to draw the acetylene into the flame comes from the oxygen. As a general rule, a large excess of this gas is necessary. However, this kind of torch gives good results in some cases.

The method has been largely superseded, however, by what is known as the high-pressure system, in which both gases are introduced into the flame under an appreciable pressure, which produces a certain and constant mixture. The theoretically perfect flame is one that uses equal parts of acetylene and oxygen. One of the leading torches has succeeded in burning these gases in the proportion of 1 to 1.14.

A number of different sizes and styles of torches have been developed according to the different uses that have been found for the process, from a jeweler's torch to one for handling the largest casting. In addition to the hand welding-torch, we have developed a number of machine welding-torches, which have been adopted widely for tube-welding, where the seam is passed continuously under the torch. Such torches are water-cooled, as the service conditions are severe.

In welding cast-iron, the piece is first prepared by chipping the crack in the form of a 'V', so that the weld can be made the entire thickness of the metal, thus producing a weld of full strength. In handling cast-iron where the shape is somewhat irregular, as is usually the case, the proper heat treatment is fully as important as the actual making of the weld. For ordinary work the casting should be heated slowly, until it has become a dull red. The weld should then be made while it is still at this temperature, and the piece afterward cooled slowly. If this plan is not followed, strains are likely to be developed that will crack the casting when it becomes cool. The softer metals, such as brass and aluminum, have to be heat treated much the same as cast-iron, but on account of their lower melting-temperature they are not heated to such an extent. In welding steel, expansion and contraction are not so important as in cast-iron. On account of its ductility and greater strength, the heating strains, while they are present to a certain extent, do not cause the trouble encountered with castings, which are more brittle.

In regard to flux, I have found that in most steel welding a flux is not necessary. The purpose of any flux is to float the oxide that may accumulate, or to float other dirt that may be in the weld. We find that in steel the oxide or dirt comes to the surface, and it is seldom necessary to use flux. With cast-iron the situation is different. We use a flux for that. We also use flux for brass and bronze, the basis of which is plain borax. There has been an extensive study of aluminum flux. Oxide of aluminum melts at a higher temperature than aluminum itself, so if you try to puddle your weld and get the oxide to float, you will melt through your casting and you cannot handle it. In welding cast aluminum, we find that it is often good practice in making the weld to keep puddling the weld with a steel stick, which mechanically breaks up the oxide. A weld made in that way properly executed should give a strength of 80%. With these aluminum welds we have a difficult problem, because a light tip with a torch will go through the pieces unless closely watched.

One important branch of welding is the manufacture of steel containers, such as barrels, tanks, and battery-

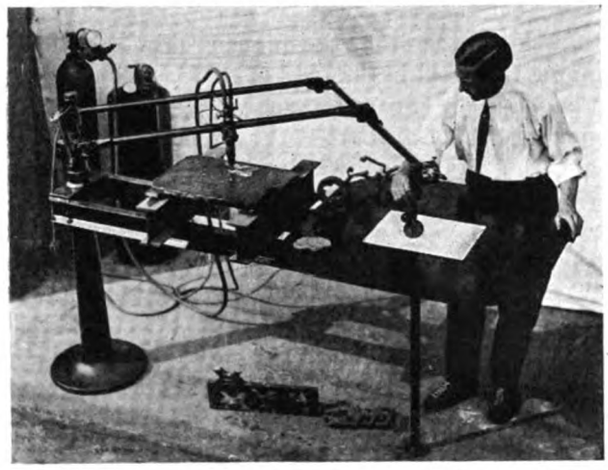
*Abstract of paper and discussion delivered before the Cleveland Engineering Society.

†Representative Davis-Bournonville Co., Cleveland.

Generated on 2024-09-30 02:10 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

cans. In this work one of the principal difficulties is the arrangement of proper jigs and fixtures to hold the metal while the weld is being made. Steel is apt to buckle or become wavy when heat is applied along the edge, and unless the proper arrangements are made to hold it a poor job will result.

We have a number of special jigs, and also a special machine for welding tanks. It is important to clamp the edges of sheet-metal tanks while they are being welded. We make some of our clamps from cast-iron, with a water-cooled chamber in which the water is circulated continuously so that the clamps will not become too hot and get out of shape. Automatic machines have been developed for welding barrels and tanks in which the torch is carried along the seam by a carriage similar to that on



CUTTING WITH THE 'OXYGRAPH'

a lathe. This will do the work in less than half the time it can be done by hand, and produces a fine piece of work.

Of equal importance to welding is the cutting of steel by the oxy-acetylene process. The torch used for this work is similar to the welding torch, except that in addition to the regular oxy-acetylene flame, a jet of pure oxygen can be turned on, which actually does the cutting. The piece to be cut is heated on the edge with the regular flame, after which the oxygen is turned-on. A hand-torch is used for miscellaneous work, such as cutting out patches in boilers, cutting irregular shapes in plates, cutting steel beams, and wrecking steel buildings.

A machine built on the principle of the common drawing-board pantograph has found a wide commercial application in cutting dies and stripping-plates, cams of irregular shapes, and the butt-end of connecting-rods. The motor will run on either direct or alternating current of 110 or 220 volts, and the pointer has a constant speed of travel through a train of gears. The pointer is guided over a drawn design and the same design is cut from the metal.

A clean cut is a relative term. But with the use of the machine we can get one that approximates a saw-cut, except that it has slag on it. With the hand-torch we cannot get so smooth a cut, because of the motion of the operator's hand. We make a good many holes with a torch for rivets and they work satisfactorily. But these are not as smooth as a drilled hole. Our torch will pierce steel up to about 2 in. thick.

We have found that the tungsten, manganese, and some chromium alloys are particularly hard to cut. You can cut them only by heating them, heating the entire piece, which often is not advisable. We can cut steel of practically any carbon up to 1.25% tool-steel. Heating the piece facilitates the work. Less oxygen is used and the work is accomplished more quickly. We have not yet been able to regulate the depth. The cutting torch must be driven all the way through to eliminate the oxide.

Unloading and Handling Material on the Charging Platform at the Holt Foundry

Raw materials for the foundry of the Holt Manufacturing Co. at Stockton are delivered on a siding at the rear of the building, directly back of the cupola. Cars of pig-iron and scrap are unloaded by a magnet controlled by an electric hoist. The hoist and magnet run on an elliptical mono-rail about the same shape as a racetrack. One 'straightaway' is directly above the siding and the other is above the charging-platform in front of the cupolas. The magnet is lowered to pick up the material from the cars, and is then raised and the

MONO-RAIL WITH MAGNET LOADED WITH PIG-IRON

hoist run around to the platform, where the pig-iron or scrap is deposited on the stock-piles or else in the wheelbarrows ready for charging the cupola. Manual labor in handling material is reduced to a minimum.

Considerable use is made of canned borings and turnings from other operations. Experience shows that these materials, in many plants considered to be a waste product, can be used to advantage provided the amount charged does not exceed 5% of the total charge of metal.

Generated on 2024-09-30 02:10 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Computation of Tax on 1919 Income

While there are many corporations and individuals in the metal trades on the Pacific Coast for whom the filing of an income-tax return for the year 1919 will be nothing but a matter of form, nevertheless such a return will have to be filed, even if little or no tax is to be paid. Taxpayers in general are fortunate in one respect as compared with last year, since the provisions governing taxes for the year 1919 have been known since the law was passed a year ago, and there will be ample time before March 15 to file a complete return. This will furnish a pleasing contrast to last year when the provisions of the law were decided definitely only a few days before the last date for filing a return.

Except for a general reduction in both personal and corporation taxes, most of the provisions of the law are the same as last year. Returns must be filed on or before March 15 accompanied by the payment of at least one-fourth of the tax due. Other installments of one-fourth of the tax must be paid on or before June 15, September 15, and December 15. The exemption for a single person is $1000; for a married person or the head of a family, $2000. An additional exemption of $200 is allowed for each child under 18 or each dependent person (other than husband or wife) dependent upon and receiving his chief support from the taxpayer, if such dependent person is incapable of self-support because mentally or physically defective. A husband and wife living together but each with a separate source of income are entitled to but one personal exemption of $2000. If they make separate returns they may divide the exemption or either one may claim all of it. It might be mentioned in passing that, on account of the surtax, where both husband and wife have large incomes, they will save taxes by making separate returns.

Items not taxable and which need not be specified in the return include property received by gift or inheritance, proceeds of life insurance policies, return of premiums on life insurance, endowment, or annuity contracts, amounts received from health or accident insurance or under workmen's compensation acts, interest on State, municipal, county, or Federal farm-loan bonds, as well as interest on the 3½% bonds of the First Liberty Loan and the 3¾% bonds of the Victory loan.

The law also provides an additional exemption for Liberty Bonds and Victory notes, the maximum possible being as follows:

Five thousand dollars in the aggregate of first 4s, first 4¼s, (issues of May 9 and October 24, 1918), second 4s and 4¼s, third 4¼s, fourth 4¼s, treasury certificates and war saving certificates.

Thirty thousand dollars of first 4¼s (issue of October 24, 1918, only), until the expiration of two years after the termination of the War.

Thirty thousand dollars of fourth 4¼s, until the expiration of two years after the termination of the War.

Thirty thousand dollars in the aggregate of first 4s, first 4¼s, second 4s and 4¼s, third 4¼s and fourth 4¼s, as to the interest received on and after January 1, 1919, until the expiration of five years after the termination of the War.

Forty-five thousand dollars in the aggregate of first 4s, first 4¼s, second 4s and 4¼s, and third 4¼s, as to the interest received after January 1, 1918, until the expiration of two years after the termination of the War; this exemption conditional on original subscription to, and continued holding at the date of the tax return of, two-thirds as many bonds of the Fourth Liberty Loan.

Twenty thousand dollars in the aggregate of first 4s, first 4¼s, second 4s and 4¼s, third 4¼s, and fourth 4¼s, as to the interest received on and after January 1, 1919; this exemption conditional upon original subscription to, and continued holding at the date of the tax return of, one-third as many notes of the Victory Liberty Loan, and extending through the life of such notes of the Victory Liberty Loan.

Total exemption, $160,000.

A person buying and selling merchandise must find his profits for the year on the following basis: First, ascertain the gross sales or total cash receipts. Then add together the inventory at the beginning of the year and the purchases of goods for re-sale. From this latter sum, subtract the inventory of goods on hand at the year's end, and the result is the cost of goods sold. This cost, plus necessary expenses incurred solely in conduct of the business, is to be deducted from the gross sales, and the result is the net earnings of the business.

A professional man arrives at his professional income by ascertaining the total of fees for services and deducting therefrom all expenses connected directly and solely with his practice.

From the total of all items of income there are certain deductions allowable by law. All interest paid on personal indebtedness and all taxes paid during the year are deductable, except federal income and excess profits taxes, inheritance taxes, and assessments for local improvements, such as sidewalks, sewers, etc. Losses incurred in business or trade are allowable, also losses arising from fires, storms, shipwrecks, or other casualty, or from theft, in cases where such losses are not compensated by insurance or otherwise. Debts due to the taxpayer actually ascertained to be worthless during the year are deductible.

Depreciation on property used in a profession, in business, or in farming is another item that may be claimed as a deduction. The storekeeper may claim depreciation on his fixtures, and on his delivery horses and wagons, but not on his stock held for sale. The professional man may claim similar deduction on his instruments.

Generated on 2024-09-30 02:06 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Contributions or gifts actually made in 1919 to organizations operating exclusively for religious, charitable, scientific, or educational purposes, and to societies for the prevention of cruelty to children or animals, may be deducted, to an amount not exceeding 15% of the net income computed without the benefit of this deduction.

Dividends on stock shares are income, and must be included in the gross figures, although the law does not impose the normal tax on distributions made by domestic corporations.

After all deductions are made, the normal tax is 4% on the first $4000 of net income above the exemptions, and 8% on the remaining net income, as compared with the 1918 rates of 6% and 12% respectively. The surtax, which is in addition to the normal tax, is the same as last year, and is imposed at graduated rates on the entire net income, before deduction of exemptions, in excess of $5000. Assuming a total exemption of $2000, the surtax rate and the total tax to be paid for various incomes is as follows:

Net income	Surtax, %	Total tax
$3,000	..	40
4,000	..	80
5,000	..	120
6,000	1	170
8,000	2	370
10,000	3	590
20,000	8	1,990
30,000	13	3,890
40,000	18	6,390
50,000	23	9,190
100,000	48	31,190
150,000	52	61,190
200,000	56	93,190
300,000	60	161,190
500,000	63	303,190
1,000,000	64	663,190
5,000,000	65	3,582,530

The normal tax on the income of corporations is 10% instead of 12% as last year. This tax is computed after deducting from such income the excess-profits tax, plus, in the case of domestic corporations, an exemption of $2000.

The excess-profits tax is computed as follows, after deduction of 8% of the invested capital plus, in the case of domestic corporations, an exemption of $3000:

20% upon the remaining net income not in excess of 20% on the invested capital, and

40% of the amount of the net income in excess of 20% on the invested capital.

In place of the war-profits tax of last year, it is provided that the tax for any corporation deriving during 1919 a net income in excess of $10,000 from any government contract or contracts made between April 6, 1917 and November 11, 1918 shall be the sum of the following:

1. Such a part of the tax computed at the rates specified above as the part of the net income not attributable to such government contract or contracts bears to the entire net income.

2. Such a part of a tax computed at the 1918 rates as the part of the net income attributable to such government contract bears to the entire net income. As will be remembered, the war and excess-profits taxes for 1918 were computed as follows:

The war-profits tax was 80% of the difference between the net income for 1918 and the sum of the following:

(1) The average amount of profits for the years 1911, 1912, and 1913; (2) 10% of any increase of invested capital for 1918 as compared with the so-called pre-war period of 1911, 1912, and 1913 (or less 10% of any decreased capital); (3) a $3000 specific exemption. The sum of these three was the war-profits credit, or the amount of income not taxable under this head.

In figuring the excess-profits tax, 8% was considered a reasonable return on invested capital, plus $3000 specific exemption. This was the excess-profits credit and represented the amount of income not taxable under this head. The remainder of the income was taxable under certain fixed percentages, known as the 'first bracket' and the 'second bracket'. The first bracket provided for a tax of 30% on income in excess of the excess-profits credit, but not exceeding 20% on the invested capital. The second bracket provided for a tax of 65% on all net income in excess of 20% on the invested capital.

Turning to examples of the application of the law, let us first take the case of John Brown, with a salary of $3600 per year and no other income. He has a wife and three children under 18, and pays $75 per year in other than income taxes. He computes his income-tax as follows:

Income		$3600
Deductions (as married man)	$2000	
" (for three children)	600	
" (for taxes)	75	2675
Taxable income after deductions		$925
Tax at 4%		$37

If he has lost through investments as evidenced by a closed transaction, $500 during the year, his taxable income is reduced to $425 and his tax to $17. He cannot, however, claim depreciation like the man in business for himself, nor can he deduct a loss in the sale of his own residence. If he made $4000 on certain outside business transactions and lost $500 on others, his taxable income is increased to $4425, and his total income to $7100. He then pays a normal tax computed as follows:

4% on $4000	$160
8% on $425	34
Total normal tax	$194

In addition he pays a surtax computed as follows:

1% on net income between $5000 and $6000	$10
2% on net income between $6000 and $7100	$22
Total surtax	$32

The total normal tax and surtax is $226. Any income his wife might have would increase his taxable income and taxes accordingly. Taxes on incomes from partnerships are computed in the same way as taxes of salaried individuals or individuals in business on their own account.

Turning to corporations, assume that the Brown Manufacturing Co. has an invested capital of $110,000 and an income of $50,000 in 1919. The excess-profits credit is composed of the $3000 exemption plus 8% on invested capital of $110,000, or $8800, making $11,800 in all. The excess-profits tax is computed as follows:

20% of invested capital of $110,000	$22,000
Excess-profits credit	11,800
Subject to tax under 'first bracket'	$10,200
Tax, 20% of above amount	$2,040

Generated on 2024-09-30 02:06 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Total net income	$50,000
Already considered	$22,000
Subject to tax under 'second bracket'	$28,000
40% of above amount	$11,200
Brought forward	2,040
Total excess-profits tax	$13,240
Exemption for computing normal tax	2,000
Total amount to be deducted from net income before computing normal tax	$15,240
Normal tax, 10% of $50,000 minus $15,240	3,476
Total corporation tax	$18,716

This may seem like a large proportion of the total income to hand over to the Government, but the stockholders of the company may gain some comfort from the fact that the tax computed by the 1918 rules would have been $24,708.80, and might have been worse yet if the question of war-profits happened to enter into the discussion.

The computation of the tax becomes more complicated in case the company derived more than $10,000 of its 1919 net income from Government contracts entered into after the United States entered the War and before the Armistice. Let us assume that $20,000 of the net income was so derived and that the average income and invested capital for the years 1911, 1912, and 1913 were $10,000 and $50,000 respectively. Then the computation is as follows:

Excess-profits credit, as before		$11,800
War-profits credit comprises exemption	$3,000	
Pre-war net income	10,000	
10% of $60,000 (difference in capital)	6,000	$19,000
Subject to tax under 'first bracket'		$10,200
Tax on above amount at 1918 rate, 30%		$3,060
Subject to tax under 'second bracket'		$28,000
Tax on above amount at 1918 rate, 65%		$18,200
Total excess-profits tax at 1918 rates		$21,260
Subject to tax under war-profits clause ($50,000 minus $19,000)		$31,000
War-profits tax on above amount at 1918 rate, 80%		$24,800

As this latter amount is larger than the excess-profits tax as computed above at the 1918 rate, and the Government always gets the best of it, this figure is used in the subsequent computations.

Since $30,000, the net income not obtained from Government contracts, is 3/5 of the total income, the tax assessed against this part of the income is 3/5 of the ordinary excess-profits tax already computed ($13,240) or $7944. The part assessed against the income from Government contracts is 2/5 of $24,800 or $9920. The total excess-profits tax is the sum of these two, or $17,864. To obtain the normal tax, subtract $17,864 plus the $2000 exemption from the total net income of $50,000 and take 10% of the remainder, or $3013.60. The total tax is the sum of these two, or $20,877.60.

THE Sunday school teacher chose the miracle of the water being turned into wine as the subject of the usual Bible lesson. After telling the story she asked a few questions. One of them was:

"When the new wine was brought to the governor of the feast, what did he say?"

A little girl, remembering what she had heard on some festive occasion, called out:

"Here's luck!"

Machinery Trade of Japan

By C. V. LONG*

The industrial progress of Japan has been especially rapid during the period of the War and has been promoted to a large degree by the introduction of American and other foreign machinery. The imports of machinery and parts of machinery into Japan for the past five years were as follows: 1918, $29,248,999; 1917, $14,918,758; 1916, $8,135,407; 1915, $4,532,184; 1914, $12,471,182.

Since Japan was obtaining a large proportion of its imports from Europe prior to the War, imports fell off considerably during 1915. However, during the same year the United States increased its share from 20% to 32% and that of Germany decreased from 22% to 6%. From that time until now the proportion of American machinery imported has continued to grow, until at the end of 1918 the United States was credited with over 80% of the total.

The principal types of machinery in the order of their importance and value of imports into Japan during 1918 follow:

Machinery	Value
Spinning machinery	$4,278,916
Steam-boilers and accessories	3,767,635
Metal and wood-working machinery	3,320,892
Electrical machinery (all classes)	1,530,685
Sewing machines and accessories	1,544,424
Endless belts for paper-making	1,316 675
Carding cloth	760,327
Gear-cutters	603,667
Paper-making machinery	560,235
Gas-compressors	501,059
Pumps	419,905
Pneumatic tools	367,610
Endless metal nets for paper manufacturing	345,786
Weaving looms	328,872
Iron rollers	321,054
Cranes	255,744
Gas and petroleum engines	252,728
Steam-engines	231,665
Capstans and other winding machines	187,602
Locomotives and tenders	149,148
Hydraulic presses	142,137
Steam-turbines	137,670
Printing machinery	119,710
Other machinery	7,804,853
Total	$29,248,999

As a result of these extensive imports the manufacture of various types of machinery has increased quite rapidly.

It will be seen by examining the following table that the present output is being sold practically in the Far Eastern countries only, although more detailed statistics indicate that an effort was made in 1918 to establish a market for Japanese machinery in South America. The values are given in yen (the normal value of the yen being $0.498):

Country of destination	Electric machinery Yen	Spinning and weaving machinery Yen	Lathes Yen	Other machinery Yen
Australia	296,085	.....	.....	.....
British India	.....	2,135,245	241,952	.....
British Straits Settlements	.....	.....	.....	451,646
China	1,187,348	1,397,480	.....	2,041,430
Dutch India	316,982	.....	314,302	431,118
France	245,219	.....	.....	.....
Kwangtung province	1,684,774	.....	234,111	2,669,590
Other countries	674,789	61,644	216,290	1,196,531
Total	4,405,197	3,594,369	1,006,655	6,790,315

*Secretary to commercial attache, Tokyo.

Generated on 2024-09-30 02:08 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Measuring the Temperature of Molten Steel

In a paper presented at the convention of the American Foundrymen's Association, F. W. Brooke, of the Electric Furnace Construction Co., called attention to the disadvantages in the use of thermo-couple pyrometers for such high temperatures, including the difficulty of protecting the couples from the action of heat and from the chemical reaction of the slag, as well as the fact that the varying thickness of the coating of slag causes a varying lag of temperature from the steel to the couple. Regarding radiation-pyrometers, he stated that the Thwing or the Foster types of fixed-focus pyrometer appear to be most satisfactory, as they require no focusing and the method of handling them is simple. Both of these instruments also have an attachment for taking care of the change in black-body conditions from true black-body conditions when steel is poured from a furnace or from a ladle. The accuracies of these attachments are not so important, as they are the same for each heat as long as the steel is in a completely molten state. The first obvious objection is that owing to the slag covering in the furnace, and the difficulty of, and objection to, maintaining an uncovered patch, the temperature cannot be read until the steel is poured into the ladle. While this only allows for correction of temperature in one direction, it still has several valuable advantages. If the temperature of the steel is too low, preference can be given to the heavy castings of large section and the pouring done as rapidly as possible. If the temperature is on the high side, the steel can be left in the ladle or preference given to all the small castings requiring a relatively higher temperature. Perhaps the greatest value of the pyrometer reading is as a check and guide for the melter and the foundry superintendent on the common and somewhat crude practical methods to be explained later. In the open-hearth furnace, when consecutive heats are being run to the same analysis and same conditions, a certain difference of temperature between the steel and the slag may be assumed, but this is not reliable.

The principal difficulty with radiation-pyrometers is that the observer should focus through a clear atmosphere and on a clean stream of steel. In actual practice, smoky atmospheres and incandescent gases are constantly interfering, while in many furnaces the slag comes out of the teeming-spout along with the steel and it is difficult to determine which of the readings recorded represent true conditions, or the same conditions as on the previous heat. There is also a tendency for the observer to record the highest reading on the instrument and interference of a small amount of incandescent gas can escape notice. The following readings are typical of many tests made of a stream of steel leaving the nozzle of a ladle when pouring castings of easy section weighing 30 to 100 lb. and containing 0.25% to 0.35% carbon. The readings were taken by the same instrument and the same observer, and the resulting castings were of first-class quality.

Mold	Heat No. 7 Degrees F.	Mold	Heat No. 23 Degrees F.
1	2750	1	2790
2	2840	2	2800
3	2760	3	2210
4	3170	4	2840
5	2790	5	2710
6	2870	.	....

It is obvious that the readings on the fourth mold of heat No. 7 and the third of heat No. 23 were decidedly off, although every care was taken on both these heats to get uniform conditions. The error is undoubtedly due to incandescent gases and smoky atmosphere. Results both better and worse were obtained, and these are given as typical when every care was taken.

Practically the same limitations are noticed with optical pyrometers as with the fixed-focus radiation type, the added disadvantage being that with every type of optical instrument more of the personal element is introduced because of the matching of intensities or the matching of colors. On the other hand, they are not so liable to damage by the too close proximity to the molten metal, as an observer has less fear of sticking a long tube up to the stream than of bringing his face too near.

Of the practical methods known, the film, rod, and pouring tests are in constant use and they all depend upon uniform conditions existing when each test is made. The film-test was developed in crucible-steel practice. A steel spoon of uniform capacity, is dried out thoroughly over the bath, and is given a covering of slag in the furnace. A sample of steel should then be taken, which fairly represents the whole bath. The temperature is then indicated by the length of time it takes for an oxide film to cover the sample completely. This length of time is affected by the composition and physical condition of the bath. Final comparisons can be made only between steels of approximately the same composition and when the furnace is ready to pour. Care must be taken to keep the sample away from drafts and to have about the same amount of steel in the spoon each time. To show the range of this test, first-class high-speed steel ingots of a composition approximating carbon, 0.65%; tungsten, 17.5%; chromium, 3.75%; and vanadium, 1%, were produced when the film (with a later characteristic wrinkling of the surface) was formed as soon as the sampling-spoon came through the door, while good castings of about 0.25% carbon and weighing from 30 to 200 lb. were produced when the film took 60 seconds to form after passing the furnace-door.

The rod-test has been used for many years as a rough indication of the temperature of many molten metals. This test requires the use of rods of steel of both uniform diameter and fairly uniform composition, and consists of plunging the rod into the bath of steel and moving it gently through the bath for a uniform length of time.

Generated on 2024-09-30 02:06 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

If the steel is cold there is a deposit of the bath on the rod, if the steel is hot the bath melts away or bites into some of the rod, with all intermediate conditions indicating varying temperatures. The skin of the bar has an effect on this test; a newly-rolled bar with a bright scaly surface tends to show a colder bath than is actually the case. The bar before being plunged into the bath should be of uniform temperature, and in some steel-works this is ensured by bending about 12 in. or more of the bar at right angles; holding the bar with the bend in a horizontal plane over the bath until it shows the first sign of sagging and then turning the end of the bar into the bath. This test also depends on the physical condition and the composition of the bath.

The pouring-test consists of using a spherical spoon of above 5 in. diam. and carefully slagging up this spoon over the bath. Dip the spoon quickly into the metal so as to get a sample of the steel from about the centre of the bath. Withdraw the sample and carefully pour out the steel over the lip of the spoon at a slow even rate. The temperature of the steel is noted by its fluidity, and by the amount of steel skull that is left on the spoon. This test is the one most commonly used in steel-foundries. It is simple and the very nature of the test gives confidence to the man responsible for pouring the heat. If he sees every drop of the steel pouring nicely over the lip he feels that in pouring from the ladle itself the castings of small section will fill up and there will be no skulls left in the ladle. This test is subject to the spoon being properly slagged up, the rate of pouring the sample, and the absence of drafts.

It must be remembered that all these practical methods are comparative tests only, and that they depend entirely upon uniform conditions, and attention to details. In all cases at least two of these methods should be employed. They do not, of course, indicate to the melter the temperature of the steel in degrees, but they do give him a good indication of the degrees of temperature that the steel is above or below the temperatures that will give him the best results for the composition of the steel he is handling, for the weight and for the type of casting he is making.

The question most frequently asked while trying the above tests was: "How accurately can you measure the temperature of the steel and what temperature should the steel be when it leaves the furnace to give the best results?" The first part of the question refers to the use of the pyrometers. In steel-works where the best conditions for the pyrometer can be obtained, we must still consider the limitations of the pyrometers themselves. As already explained, only the optical and the radiation type offer a good field for these high temperatures and conditions, and there is little doubt that a variation plus or minus 50°F. in the instrument itself is as good as we can expect. The other limitations of focusing and atmosphere have already been described.

Considering the second part of the question, the temperature required should be that at which the particular steel begins to solidify, plus the loss of temperature from the time the reading is taken to the time the steel gets to the farthest end of the thinnest section in the casting. A further query invariably was: "But how are we to know what these two values are?" The first value depends on the composition of the steel, the carbon contents being the principal factor. This can be obtained by reference to a standard carbon-iron curve, such as is shown in Fig. 1. For a steel containing 0.25% carbon, trace the line *AB* till it intersects at *C* giving a value on this curve of 2720°F.; for a steel containing 0.65% carbon, trace the line *DE* till it intersects at *F*, giving a value of 2690°F. For other elements in the steel commonly used in castings the variation is not of importance and does not compare with the many other sources of error that occur in reading the temperatures of molten steel in a foundry. The second value depends upon such variables as the heat of the ladle, the thickness of ladle-lining, time from reading to pouring, whether molds are of dry or green sand, and thickness and lengths of the thinnest sections. All of these factors depend upon local conditions, and consultation between the man responsible for the steel in furnace and the man responsible for making the molds is required. Final results are obtained only by the constant comparison of the quality of the final castings with the results obtained by the methods of reading the temperatures of the steel.

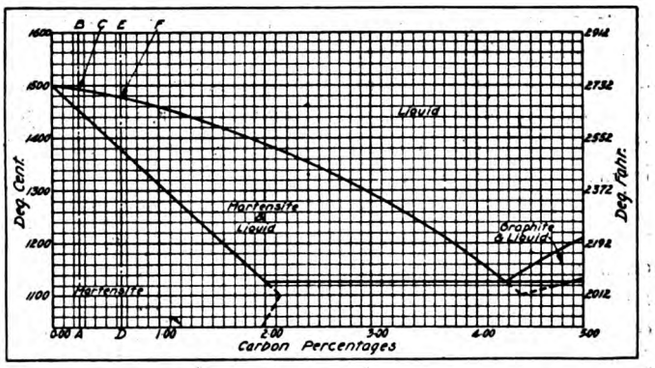


FIG. 1. IRON-CARBON MELTING-CURVES

CROSSING the Dead Sea proved no easy task in a land where commerce is at a standstill and transportation facilities are virtually nil. A Red Cross engineer who recently returned from Palestine tells how it was done.

"It was necessary to carry a boat from Jaffa, on the seacoast, to Jerusalem in order to cross the Dead Sea to Jericho to get grain to take back to Jaffa. This journey of something more than one hundred and twenty miles was over an almost impassable terrain, some of it lowland, hundreds of feet below sea level, and much of it rugged, mountainous country. The Dead Sea itself is one thousand feet below sea-level.

This is typical of transport difficulties all over Palestine.

Generated on 2024-09-30 02:06 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Heating Rivets by Electricity

In a paper presented at the convention of the American Steel Treaters' Society, E. F. Collins, industrial-heating engineer for the General Electric Co., discussed several applications of electric heating, including the heating of rivets, saying in part:

The muffle-type electric furnace is not so well adapted for heating rivets as a heater consisting essentially of a transformer, the secondary of which is designed to give heavy currents at a low voltage, the rivet itself forming a part of the circuit and being heated by the passage of current.

Preferably, a rivet should be heated from the inside; the shank may be desired hotter than the head, and yet should be heated uniformly throughout its length. These are ideal upsetting conditions, and further, the head being cooler, is less malleable, and therefore less likely to be marred by the backing-up tool.

In order to butt-weld two pieces of steel or copper with an electric current, it is usually necessary to pre-heat the ends that are to be welded, if burning at the weld is to be avoided. For example, when the current is first passed through a cold joint, the heat will concentrate at the joint to such an extent as to burn the piece. If now the current be cut off as soon as the joint reaches a red heat, the heat will travel back into the pieces, and this will raise the temperature of the entire length held between the jaws.

If after a few seconds, the current is again applied, there is less tendency to burn at the joint, and possibly the weld will be made without further interruptions being necessary. The number of times it is thus necessary to pass current through a joint before the weld is finally made, will depend on the size, shape, and preparation of joint.

This principle applies to heating rivets by an electric current. If a conduction rivet-heater is constructed with only one pair of jaws or with several pairs in multiple, so designed that the current through the rivets is not interrupted while they are being heated, they will probably over-heat at the end before the shank and head have become sufficiently heated. I have witnessed the operation of a machine of this type, and have observed that it is frequently necessary to remove a rivet that has become overheated at the end, and allow it to soak until the heat has distributed, after which it can again be put into the jaws and heated satisfactorily without further difficulty. This difficulty can be eliminated by designing the machine to heat two or more rivets in series, as distinguished from multiple, so that whenever a hot rivet is removed for driving, the current is broken through the remaining rivets. The time interval which thus elapses until a cold rivet can be inserted, allows the required soaking period for the heat in the remaining rivets to diffuse, giving a more uniform heating when the circuit is again completed.

As previously stated a rivet should preferably be heated from the inside. With this conduction type of heater, the current passes through the rivet lengthwise, the energy is thus expended inside the rivet. The shank is uniformly heated throughout its length, and the head, having a larger cross-section, need not attain as high a temperature as the shank.

The machine used has two pairs of jaws, and heats rivets in series. It has a capacity of approximately 75 lb. of rivets per hour, consuming, at this rate, about 15 kw. with a load factor of 80%. The weight is approximately 530 lb. It consists of a shell-type transformer-core upon which the primary windings are mounted, and a low voltage secondary, of only one turn of heavy copper, which, for convenience, is made movable with respect to the core.

Having the secondary movable with respect to the primary and core is a feature of this heater, and this is accomplished by making the secondary of two arms or bars of heavy copper, which extend through the windows of the shell-type core, and are hinged at one end, so that each arm can be moved independently of the other. The arms are connected together at the hinged end by a heavy shunt of leaf-copper, and the electrodes for holding the rivets are mounted on the other end. The electrodes or jaws are of copper also. They are large and the surfaces are corrugated in order that they may dissipate the heat generated in them, without resorting to auxiliary cooling by water.

The transformer is mounted on a stand made of angle-iron, and two pedals, one for each of the arms mentioned above, are provided, so that each arm can be raised independently of the other. This heater will accommodate any rivet up to 5 in. long, no adjustment being required for the various lengths. The operator raises the electrodes by means of the foot-pedals to any desired height. It is of simple design and rugged construction, the only spares necessary being a set of copper blocks or jaws. The primary coil of the transformer is provided with three taps, thus making available four values to which the secondary voltage may be adjusted. The voltage-control thus obtainable is necessary, in order that the machine may heat properly all the various lengths of rivets that the jaws are capable of holding.

The heater may be mounted on wheels or a truck if desired, and thus made available for use in any part of a building or a manufacturing plant. Power is used only when actually heating rivets, as the circuit is open unless there are rivets in both jaws.

In continuous operation, from three to five pounds of rivets can be heated per kilowatt-hour, depending on the size and length. Short rivets require less energy per pound than larger sizes. In actual test, a 15-kw. machine heated 500 rivets, $\frac{1}{2}$ in. diam. by $\frac{1}{4}$ in. long, per hour, the energy consumed being 10.5 kilowatt-hours.

Generated on 2024-09-30 02:09 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

The following table gives the approximate production in rivets per hour on this machine:

Length under head to point in inches	Diameter						
	¼	⅜	½	⅝	¾	⅞	1
½	2000	1200	700	550	350	240	170
1	1800	1000	570	450	280	180	140
1½	1500	800	500	350	230	160	120
2	1200	600	450	300	190	130	100
3	800	500	330	220	140	100	80
4	700	450	280	170	120	90	60
5	600	400	230	140	...	...	...

It would of course be impossible to handle the rivets at the rates given for the smaller sizes.

Special Problems in Welding Castings

In a paper presented at the recent convention of the American Foundrymen's Association, George B. Malone, of the Bayonne Steel Castings Co., discussed the welding of castings of different metals and different sections. In speaking of pre-heating, he called attention to the fact that the temperature to which any piece should be pre-heated depends upon the metal of which it is made, its shape, size, and the purpose of the pre-heating. To illustrate the differences in pre-heating temperatures, consider first a heavy piece of cast-iron, the shape of which should not produce any shrinkage-strains when cooling, and on the other hand a light, complicated casting such as an automobile-cylinder. In the first case it is evident that the purpose of pre-heating is largely to save gas and labor, and that the pre-heating can be carried to as high a temperature as a cherry red because there will be no danger from distortion or cracking. In the second case, the pre-heating must not be carried to so high a temperature as to warp the cylinder, and still it must be carried high enough to permit contraction without cracking when cooling. The amount of gas saved by pre-heating is small. In the first case, the temperature mary vary from 1200° to 1500°F., while with the cylinder it should not exceed 800°. In other cases, where the style or type of cylinder is simple, a low temperature is sufficient. Pyrometers should be used to measure the heat. In welding hollow castings that may have small blow-holes, great care must be taken. It is important that these castings should be pre-heated first.

If wear is not a factor large steel castings may be welded without pre-heating, but in all cases, particularly where iron or steel castings lie in a damp place or where they are subjected to intense cold, it is better to bring to the welding temperature slowly. As soon as the welding-torch is applied to a cold casting there is danger of crystallization, and not only will the weld be poor but the casting will often be rendered unfit for use.

In the salvaging of brass and bronze castings by welding great care must be exercised. As an illustration, the following incident which took place in a plant where I was interested in the salvaging of castings for pistols to be used by the Government in trench-warfare, may be cited. All of the pistol-grips were made of bronze. The need for the pistols at the time was great. The maker was at his wit's end to know how to reclaim castings that contained sand-holes when received. I found that the tool department, which had control of the welding outfits, was using tobin-bronze rod in trying to salvage the pistol-grips. When they were polished, they showed a bright yellow or in some cases a gold streak where the grip was welded. Of course, the Government inspector would not pass them and hundreds were rejected. I immediately straightened out this difficulty by analysis; that is, I secured from a rolling-mill a welding rod with a higher copper content than that in the metal constituting the grip-casting itself. After welding 10 grips myself, I had them forwarded to the polishing department and from there to the Government inspector, who passed them without comment. When it is necessary to weld, first consider the casting to be welded and then endeavor to secure a welding-rod of an analysis similar to the casting. You will then find little difficulty in salvaging castings. This is particularly true in welding brass or bronze castings, which may have to be polished and will show a different color at the weld.

A great many foundrymen have experienced difficulty in welding monel-metal castings. Monel-metal castings are really not any harder to weld than ordinary castings if the proper procedure is followed. Monel metal has a large nickel content, and a nickel casting cannot be welded without pre-heating. On account of the combination of copper with the nickel in monel metal it is easy to see that both must be brought to a rather high pre-heating temperature, say 1600°F., before the weld is attempted. After the casting is welded it should be brought again to approximately 1500° and placed in hydrated lime in order to prevent any air getting to it. The average foundryman will tell you that when the weld was made the casting looked first-rate, but 10 minutes afterward it was all cracked. The reason for this is that proper care was not taken with the casting after the weld was made. The casting should have been allowed to cool slowly, preferably in hydrated lime.

"You-all gotta wait fo' yoah supper 'til I ster'lize de ice-pick," said a colored cook to her mistress. "I done drop'd it on de flo' and de hygiene teachah tol' me to be careful er germs."

This was heard in a small town in Georgia where a course in Home Hygiene was being offered to the colored women by the Red Cross Public Health Nurse. The instructor pictured to them vividly the spread of bacteria, and told them that germs could be carried to food by dirty handling and by contamination of soiled dish-towels, unsanitary refrigerators, and so forth.

After the first lesson women reported that their cooks came home, scrubbed the refrigerator, cleaned the stove, and burned up all the dish-towels.

Generated on 2024-09-30 02:07 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

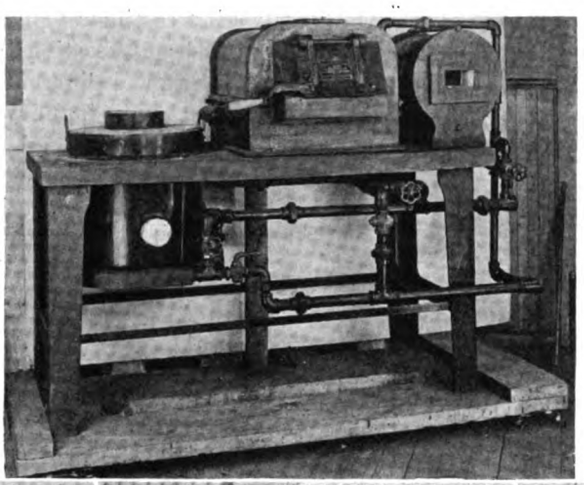
Gas in the Metal Trades

The physical state of all fuels, just prior to the time when combustion takes place, is gaseous. Any fuel, regardless of its physical condition in nature or its condition after preparation for commercial utilization, is in a gaseous state or must be gasified before its heating energy can be liberated. The ultimate physical form of the entire heating energy of the world is a gas.

Gas may be burned in many different ways, but the principal methods used for industrial work are:

1. The bunsen or atmospheric burner.
2. The fan-blast burner.
3. The positive-pressure burner.
4. The surface-combustion methods.
5. The pre-mix gas machines.
6. Modifications of these types.

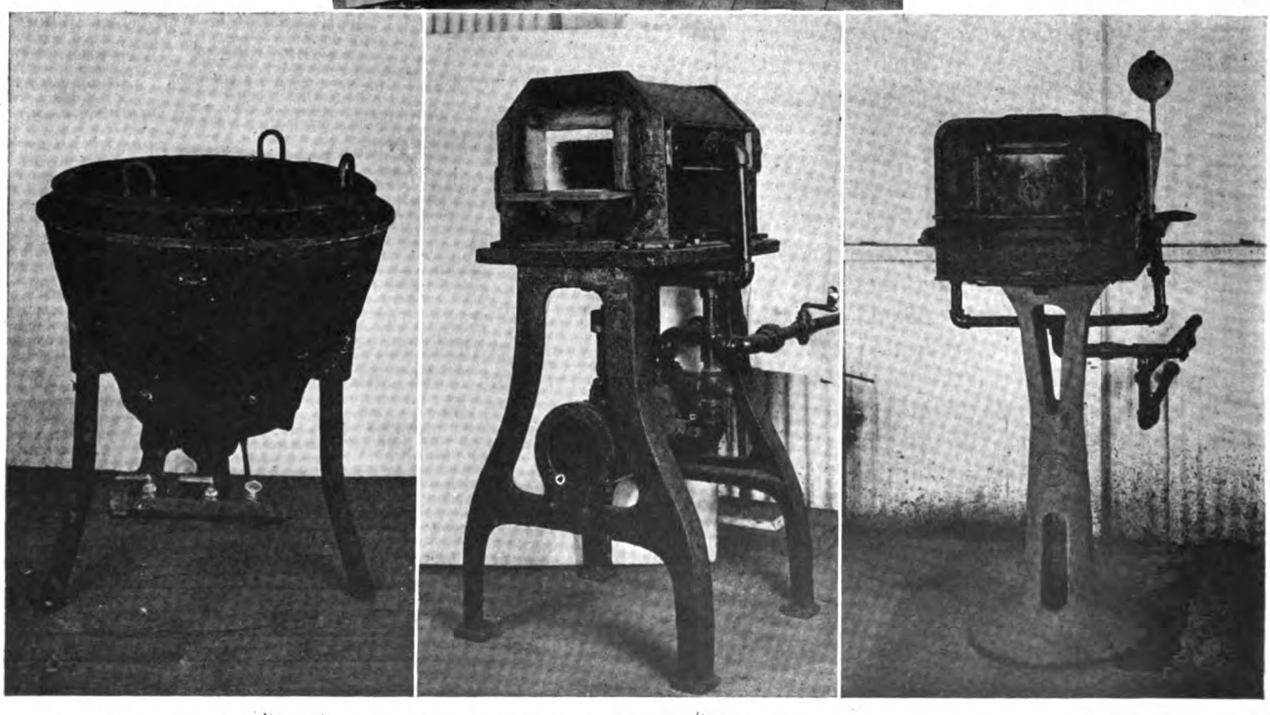
The bunsen burner is familiar to all of us. The velocity of the gas entering the mixing-tube carries part of the air through the mixing-port. This is called primary air. The additional or secondary air is supplied at the flame, enabling combustion to become complete. Many modifications of the atmospheric burner are in use, one of the standard types being the ring or giant burner. Another type, the drilled-pipe burner, is designed in every conceivable size and shape. Some of them are as much as 20 ft. long. Burners of this type are suitable for certain classes of industrial work, especially where intensity is not required.



The fan-blast burner uses air supplied from a volume blower driven by a small motor. These blowers are mainly used where a temperature slightly above the ordinary is required. In the positive-pressure burner the pressure employed is secured from a rotary blower of the involute type. Higher air-pressure is obtainable together with a consequent increase in the intensity of the flame. This type of blower is ordinarily employed in furnace and heat-treatment operations.

In the surface-combustion method, gas is used in furnaces in such a way as to convert a greater portion of the energy into radiant heat. The use of a perfect mixture of gas and air mechanically proportioned and the elimination of excess air with consequent control of character of atmosphere permits the production of high flame-temperatures.

Another method of using gas is in what are called the pre-mix machines, the principal ones being the Selas and the Kemp. The Selas system has been used extensively in shipyard work. The equip-



VARIOUS FORMS OF GAS-FIRED APPARATUS FOR MELTING AND HEAT TREATING. FOR DESCRIPTION SEE TEXT.

Generated on 2024-09-30 02:09 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

ment used pre-mixes air with the gas in proportion of approximately one and one-half parts of air to one part of gas. This mixture is transmitted through a single pipe-line to the burner, where a mixer similar to the bunsen type is used to supply the additional air required. The Kemp system premixes all of the air necessary for combustion before transmitting the mixture to the burner. In general the Kemp burners are of special design having a small cross-section and a high velocity of mixture, which tends to eliminate 'flash-backs'. An oxidizing, neutral, or non-oxidizing flame can be secured at will by a simple adjustment of the machine.

Inasmuch as the Kemp machine provides a method of burning gas without using secondary air at the burner, equipment can be used with this machine that cannot be used with the ordinary types. Gas can be burned in enclosed spaces where no air is obtainable. For instance, a soldering-pot has been developed, holding 100 lb. of solder, and insulated with 2 in. of air-cell asbestos. An area of 100 sq. in. of the top-surface of the metal is exposed. In this amount of solder, a cast-iron burner-box is immersed. Gas is led into this box through one pipe and the exhaust gases are discharged through another, both extending above the surface of the metal. By using a gas that is mixed completely with the necessary air for combustion a flame can be maintained in the burner while it is entirely immersed in the metal, which gives a high efficiency of application. In fact, about half as much gas is required to keep the metal hot as is needed when an ordinary burner is used.

At the left of the group on the opposite page is a soft-metal furnace, to which a two-ring concentric atmospheric burner is applied. The pot of this furnace is studded with projections, which increase the heat-absorbing surface together with its speed and efficiency of operation. The furnace is designed so that the heated gases of combustion are conveyed uniformly to the top of the pot, making it possible to secure an even heat throughout the metal. A charge of 500 lb. of metal can be melted in this furnace in 35 to 40 minutes.

In the centre is shown a small shop-forge of the general utility type, suitable for blacksmithing and tool dressing. Combustion takes place immediately over the hearth, the burners being placed on both sides in such a way that the burning gases surge forward, downward, and then upward, giving a quick and positive heat that is uniform throughout the chamber. A forging heat may be obtained in three minutes and the temperature held uniform over any period of time.

At the right is an oven-furnace fitted with a U-shaped bottom-slab, which prevents the flame from coming in direct contact with the work and eliminates the need for muffles, which were necessary, under the old methods where coke and coal were used as fuel. Furnaces of this character are designed for hardening carbon-steel and are suitable for annealing or carbonizing. A temperature of 1500°F. can be obtained in ten minutes and held indefinitely. Higher temperatures are obtainable if desired.

Above is a triple-purpose furnace, which comprises a complete compact plant covering practically the whole range of the heat treatment of metals. The units may be operated singly or any two at a time. On the left is a barium-chloride furnace, which may also be used for lead or cyanide hardening or for oil tempering. In the centre section is an oven-furnace of similar type to the one already described, and on the right is a high-speed steel furnace in which such an intense heat may be generated, that a rod $\frac{5}{8}$ in. diam. may be melted in ten minutes from a cold start.

One of the greatest uses of industrial gas has been in connection with the gas-fired steam-boiler. Small manufacturers in loft-buildings often require steam in moderate quantities for various processes for fabricating their articles, and for this purpose gas lends itself as an ideal and economical fuel. Underwriters permit installation on any floor without fireproof enclosure. Boilers suitable for these purposes are installed ranging from 1 to 25 hp. The gas-boiler is designed to utilize the greatest possible quantity of heat delivered to the boiler and has as much as 18 sq. ft. of heating surface per boiler horsepower. Gas-fired boilers employ a temperature of approximately 1900°F. which consists mainly of convected heat, hence a large heating surface is necessary. Gas can be used under the ordinary coal-boiler but the fact that these boilers are usually designed for a temperature of 2500°F. and to use mainly radiant heat, makes this uneconomical.

Another advantage of the gas-fired steam-boiler is in its automatic operation. The boiler is provided with a fuel-valve, which controls the amount of gas used under the boiler in accordance with the demand for steam. The control may be set at the desired steam-pressure and the fuel will be automatically fed to the boiler to keep the steam constantly near the proper pressure. This feature, together with an automatic water-feed, safety fusible plug, safety-valve, and pilot-light, causes the boiler to be almost entirely automatic in operation, and makes the cost of attendance or supervision nominal.

One of the most important industrial applications of gas has been made in the shipyards, for rivet-heating and similar work. The consumption of gas in Pacific Coast yards was recently estimated at 80,000,000 cu. ft. per month. This is as much as would be consumed in winter time by a city of the size of San Jose and Sacramento combined. Gas was adopted for heating rivets mainly because it produces a rivet of better quality than any other fuel. It occasions less oxidation or scale, and the rivet is heated uniformly and driven easily. The heat of the gas furnace can be kept at the proper point and practically no rivets are burnt as with other fuels. The average output of the size of rivet-heater in general use is 1160 $\frac{3}{4}$-in. or $\frac{7}{8}$-in. rivets per eight-hour day. It takes between $4\frac{1}{2}$ and 5 minutes to bring a $\frac{3}{4}$ by 3-in. rivet from cold to a working heat and 8 minutes for a 1 by 8-in. rivet for bull-riveting, while small rivets, such as $\frac{1}{4}$ in., take 3 minutes.

At the Union plant of the Bethlehem Shipbuilding

Generated on 2024-09-30 02:10 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Corporation what is probably the largest gas-fired galvanizing plant in the United States has been built. The first pot is 26 ft. long, 6 ft. 10 in. deep, and 26 in. wide at the top, V-shaped, and containing 50 tons of zinc. It is set on piers, braced by cast-iron struts running from the floor-line to the lip of the pot. An 8-in. wall of close-fibre firebrick forms a rectangular box around the pot.

Flames from 26 burners, 13 on each side, project through the walls in 4-in. pipe-ports pointing toward the base of the pot and into a bed of broken firebrick. The jets are staggered so that each flame passes the opposite one. The burners are designed to give a flat fan-shaped flame following the contour of the pot, but not impinging on the metal, as the continued spot-heat of a direct flame would soon bore a hole in the metal.

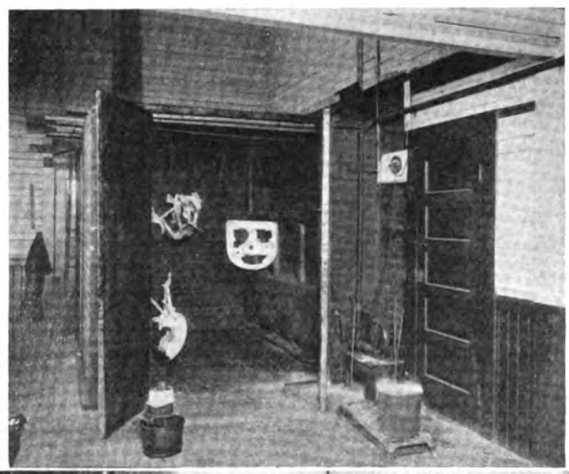
The furnace was especially designed for galvanizing ship-plates. The plates, which are from ¼ in. thick for the destroyers to ½ in. for the freighters, are first dipped in caustic to remove grease and dirt and then in a hot solution of mild acid. They then go to a drying-table to remove all moisture before being immersed in the zinc. The metal must be kept as close to 800°F. as possible, for if it is too cold, the grain is slushy and does not coat the plate evenly or if too hot, the zinc will not adhere to the plate. If a succession of heavy plates are to be dipped, the metal chills rapidly, and all the burners are turned on in order to maintain the proper temperature, while if ¼-in. plate is dipped 10 burners only are required. The flexibility of heat-control is one of the advantages of using gas for this work. With coke there is a constant fluctuation, injuring both the metal and the pot itself. With oil it is the usual practice to fire from the end of the fire-box and the continuous fierce heat wears a hole in the shell after 12 or 13 months service.

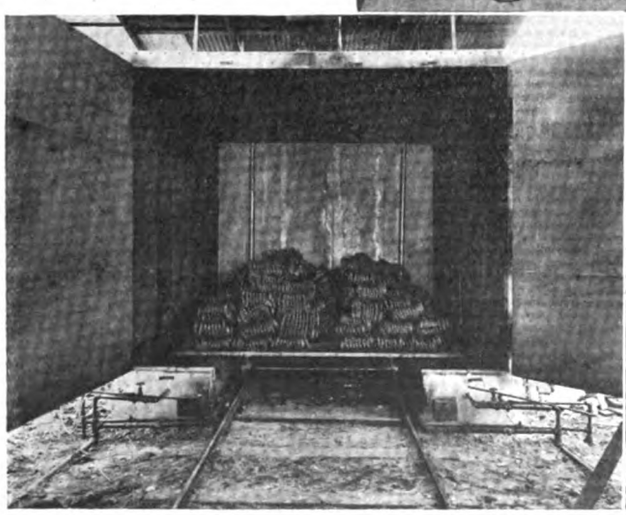
As these pots are 1⅛ in. thick and weigh many tons, it is no small task to replace them, even disregarding the original cost of the pot and the loss of production during repairs. One gas-fired pot at the Union plant has been in constant operation for 30 months and gives evidence of a continued useful life.

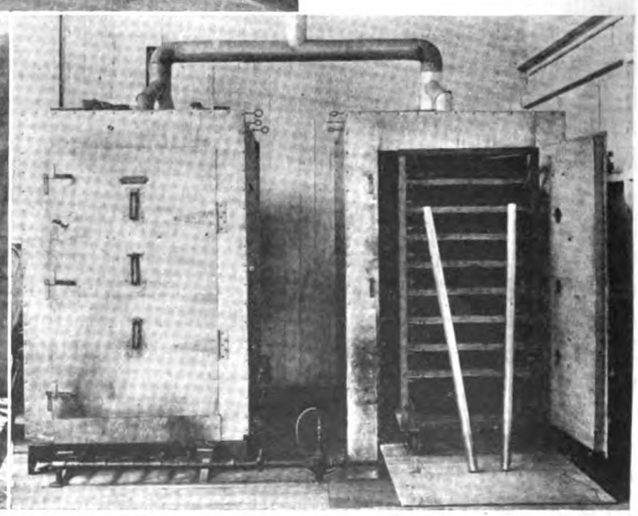
The question of waste metal or dross is also of prime importance. Spelter is worth about eight cents per pound and dross about four, so that for every pound of dross created, the company loses four cents. In some of the oil-fired galvanizing-plants in this district the dross runs 20% while with gas it is less than 10%. Cost of fuel varies with the weight, shape, and kind of metal dipped. The average is less than 1.4c. per pound.

Bending heavy channels and I-beams presents a difficult problem. To make a successful bend, the metal should be heated uniformly along the entire length as otherwise it will kink and buckle. In times past, a wood fire would be built along the entire length of the beam or it would be put in a furnace and an oil fire applied. Both of these methods proved unsatisfactory, slow, and costly. This presented an opportunity to apply gas to advantage.

A shell of a smokestack 44 ft. long and 7 ft. diam. was laid horizontally lined inside with firebrick, and the lower segment leveled to form a flat floor. Burners were placed on each side at 3-ft. intervals, staggered so that the flame would not hit the opposing burner. Beams were placed in the chamber, two or three at a time, by means of a tackle and in eight to ten minutes would be heated. Then they would be hauled out on the bending-table, spiked to the floor, and shaped to the proper form. A furnace of this type and size uses about 3600 cu. ft. of gas per hour.







ABOVE, ENAMELING-OVEN AT BAY CITY ENAMELING WORKS. AT LEFT, OVEN FOR ENAMELING SPRINGS. AT RIGHT OVEN FOR JAPANNING BED-PARTS.

Generated on 2024-09-30 02:05 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

At the plant of the Liberty Machine Works gas is used for tempering and casehardening parts for a stump-puller. Temperatures of 1600°F. are required. A furnace using 200 to 250 cu. ft. of gas per hour turns out all the work on strain-parts that five men can assemble.

At the plant of Niessen Bros. on Army street, small brass castings, such as key blanks and plates, are made.

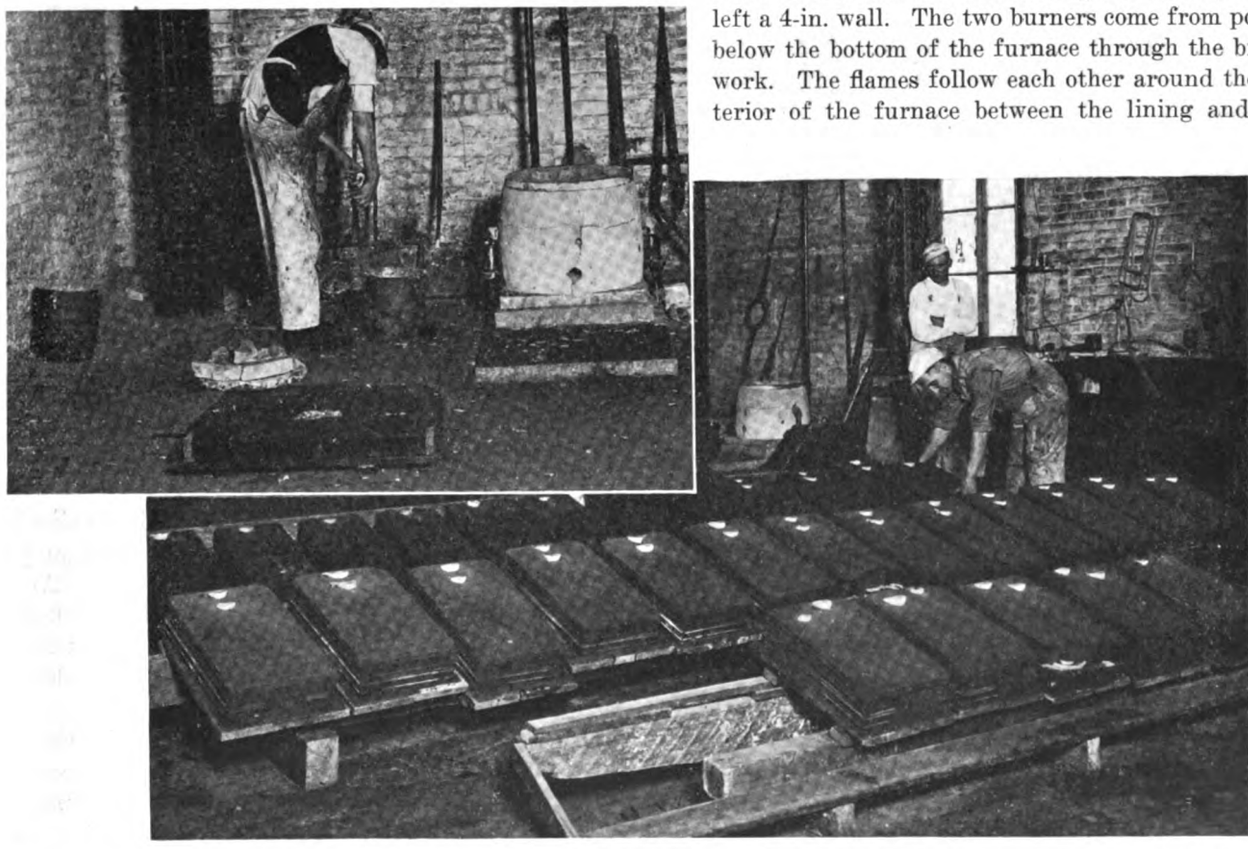
To melt a 95-lb. charge composed of 60% copper, 15% nickel, and the remainder soft metal, 500 cu. ft. of gas is used, and this is done in 1 hr. 30 min. This gives a fuel-cost of 0.5c. per pound, which compares favorably with coke at $25 per ton.

A gas-fired drop-hammer forge is used at the plant of the Kleiber Truck Co. at 11th and Folsom streets. A number of standard-shaped parts are used in the truck-assembly. The former practice was to start a coal-forge in a corner of the shop, where the smoke was least objectionable and place a few parts in the fire, from which they were taken to an electric hammer in the vicinity and formed into proper shape. The present method is to fill the gas-forge to maximum capacity, and, as fast as parts are heated, the workman removes the pieces to the electric hammer at his side where they are shaped. The fire-box of this forge is 5 in. high, 15 in. wide, and 24 in. deep. It is well insulated, thus reducing loss by radiation and concentrating the heat to a high point of efficiency. A fuel consumption of 300 cu. ft. per hour will give all the output one operator and helper with an electric hammer can handle.

The Bay City Enameling Works uses gas for baking enamel on various kinds of metal work. The oven shown at top on opposite page is built of red bricks and the door is double-walled and filled with asbestos. The burner-box is made of sheet-metal having a flue to carry off the moisture and fumes of the gas as they will cloud the enamel and cause it to run. The air-pressure comes from a Buffalo forge-blower with variable-speed control. The burner head is of an unusual type, consisting of a piece of 2½-in. pipe into which 28 pieces of ⅛-in. pipe 3 in. long are inserted. This makes a flame which is intense, noiseless, creates no vibration, and cannot be smothered. A temperature of 375 to 400°F. is maintained by burning 300 cu. ft. of gas per hour.

At the left is shown an oven used by the Premium Spring Co.'s factory for enameling springs. The oven is of sheet metal with an insulating air-space between the walls. To handle quantity production at low cost, a metal car was built to run on rails into the oven. Two cylinders, 8 in. diam., perforated to receive burners at intervals of six inches, furnish the heating elements. A sufficient amount of secondary air to support combustion enters from the front, and all fumes and moisture are carried out by means of vents. In treating work of this type a temperature of 200°F. is generally considered sufficient, considerably less than that used for automobile work.

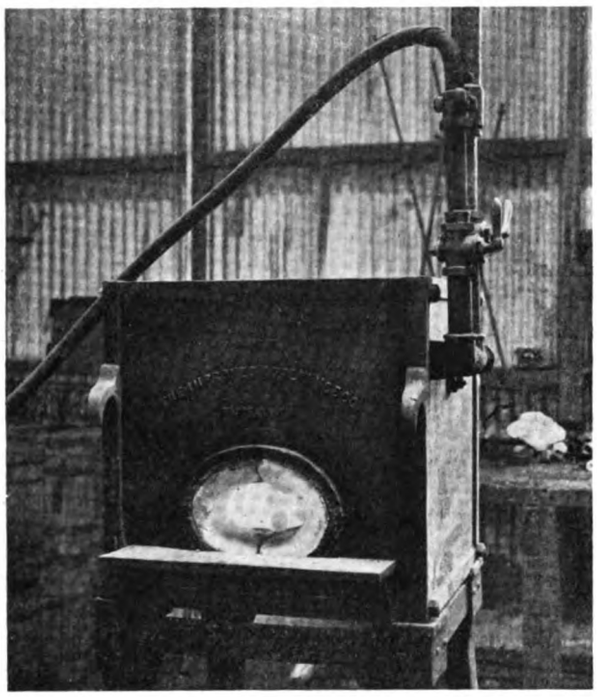
On this page are shown two views of the foundry operated by Ortman & Kretz, who specialize on small aluminum castings such as frames of automobile-windows. The furnace was made by lining the inside of a barrel with firebrick and then removing the staves, which left a 4-in. wall. The two burners come from points below the bottom of the furnace through the brickwork. The flames follow each other around the interior of the furnace between the lining and the



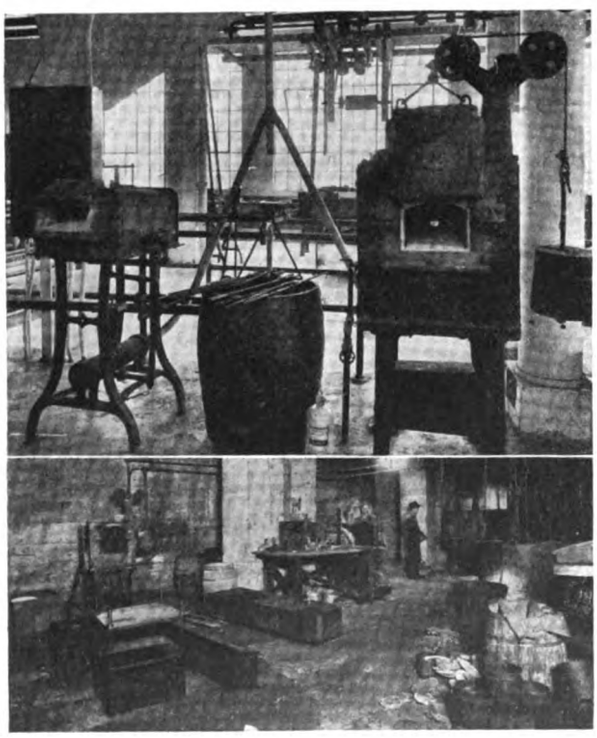
ABOVE, TAKING CRUCIBLE FROM ALUMINUM-FURNACE. BELOW, PART OF MOLDING-FLOOR. FURNACE IN BACKGROUND.

Generated on 2024-09-30 02:12 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

crucible. Their crucibles are cast-iron and have stood up well. It takes one and a half hours to make a heat for casting and although they cast every day the cost of fuel is only $9 or $10 per month. They make 25 lb. of frames per day in addition to rejects which go back to the pot.



RIVET-HEATER AT PACIFIC STRUCTURAL IRON WORKS



ABOVE, SHREVE & CO. FURNACES FOR TEMPERING JEWELERS' TOOLS. BELOW, HEAT-TREATING DEPARTMENT OF MANN MANUFACTURING COMPANY

Below is shown a rivet-heater in the Pacific Structural Iron Works that has been in continuous service for more than seven years. This firm specializes on steel-building construction, and all possible assembling is done on the shop-floor. There are two heaters in this plant and the output can keep a crew busy.

In a nearby boiler-works a rivet-heater with a door 3½ by 5 in. and floor-space 7 in. deep operates at a cost of seven cents per hour for gas and supplies one riveting-crew. In some plants the heaters are supplied with garden-hose carrying the air and gas and the furnaces moved to different stations.

The photograph below shows the heat-treating department of the Mann Manufacturing Co. which has used gas

PRE-HEATING WITH GAS TORCH BEFORE WELDING WITH OXY-ACETYLENE

for years for casehardening and tempering. The company specializes on machine gears and general automobile parts. There are two home-made furnaces and two Tate-Jones furnaces. These maintain a temperature of 1600°F. and are in constant use.

On the right on page 74 is an oven for jappaning bed-parts. The rooms are made with double-walls and the five perforated pipe-burners heat a false floor. All the products of combustion pass out through the stack above and the draft is controlled by the dampers on the side. A truck loaded with parts to be japanned is wheeled into the compartment.

Oxy-acetylene is an expensive gas and the gas-blast torch illustrated above may be used with great economy for pre-heating before welding. Air from a positive-pressure blower gives the force to the flame. A recently developed use for gas is as a substitute for acetylene in

Generated on 2024-09-30 02:07 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

the cutting of metals. Gas and oxygen are used in combination in a torch having a special burner-tip. In cutting ⅜-in. plates in the shipyards a saving in favor of gas of $2 per hour has been recorded. As to the speed obtainable ¾-in. plates are cut at the rate of 40 ft. per hour.

Every installation needs careful study as to the usefulness of gas fuel. There are few operations where gas can be placed in competition with other fuels purely on a heat-unit basis. To determine the real value of gas requires a study of the operations to be performed, the speed and quality of the work turned out, the possible saving of labor, and many other items, that may affect the net result and make for greater economy with gas notwithstanding the higher cost of the fuel considered simply as a source of heat-energy.

Acknowledgment should be made to H. M. Crawford, engineer of the industrial heating department of the Pacific Gas & Electric Co., for assistance in preparing this article.

Electric Portable Extensions From the Safety Standpoint*

The electric portable extension has, besides the fire hazard present, the danger of electric shock and potential death. The use of light-weight lamp-cord or old wire on which the insulation has become brittle permits even slight wear to break through the insulation. Even new and well-insulated cord, when hauled about unnecessarily, will also wear rapidly. The use of long runs of wire, unsupported, causes the copper to stretch and may so reduce the cross-section of the wire that the current-carrying capacity becomes low enough to cause heating and even sudden melting with a tendency to flash at the reduced cross-section. Single wires used for cord show this tendency to 'neck-out' even more than stranded cable or cord.

Kinks localize strains that break both insulation and wire when an attempt is made to pull them straight by sudden jerking. When a cord has been coiled, it should be uncoiled by unrolling and not by paying out so that the cord lies like a corkscrew on the floor. In this form it kinks readily, snarls with rubbish and tools, and catches on staging and trips workmen. Hanging long stretches of cord from nails may cut or crimp the insulation, thus causing short circuiting inside the cable, or over the nail.

Extension cord is subject to severe wear from being dragged over the ground and floors in grit, and over and along sharp edges and from exposure to water, oil, heat, and chemicals. It is not uncommon to see bare spots on cords where the insulation has been rubbed off, and also small pieces of wire from stranded cable piercing the insulation in such a manner that they may cause a shock to persons handling the cord, or so charge other equipment that shock may occur by contact with it at points remote from its contact with the cord.

Frequently, in an emergency, light-weight cords of small carrying capacity are picked up at random and used to supply small boring and reaming tools, fans, drills, and even several large lamps. The cord, being badly overloaded, heats so that the insulation is ruined and it may cause a fire or a shock when handled. Many times the bare lamp permits light from extensions to shine directly into the eyes of the workmen. This not only causes poor work, but also blinds the workmen so that when they step from this brilliant light, they stumble.

Merely mention of the fact that 110 volts, the ordinary lighting and small electric fan and tool voltage, is frequently fatal, is sufficient to start a small riot of argument. The fact remains, however, that accident records show that nearly as many deaths are caused by this voltage as by the higher voltages. The only essential for a fatality is a good contact with the wires of a circuit or a source of current and with the ground. A small point of bare wire, a grounded socket, or a lamp guard gripped by the hand of a workman while in contact with the steel frame of a building or with steam, gas, water, or sprinkler pipes or with his feet in a puddle of water is often sufficient to establish a circuit through the body.

*Abstract from 'Safety Engineering'.

France Enmeshed in Barbed Wire

Northern France is at present engaged in a giant spider-web party, and from the present looks of things, has eight years more to play. More than 50,000 miles of barbed-wire entanglements were laid in France by the struggling armies during the War and only 6000 miles have been rolled-up. The disappointing thing about this little cobweb pastime is that after you have followed the unwieldy strands around trees and across miles of barren waste, at the end you find nothing more exciting than a tumbling shack of a house or a gaunt war-shattered tree. American Red Cross figures on the reconstruction of homes show that 60,000 of the 550,000 houses wrecked by shellfire have been made habitable, mostly with temporary repairs. Of the 1160 industrial plants destroyed, 588 have been repaired. The Government has repaired 2016 kilometres of the 3246 kilometres of railways that were torn up and 700 of the 1675 kilometres of canals rendered useless are again in commission.

In the Cluny Museum the Red Cross guide was displaying a large clumsy letter-sealing device used in the old French courts for official documents. It resembled a pair of tongs similar to a utensil frequently used to prepare breakfast in American kitchens. One soldier glanced at it nonchalantly. Suddenly his face lighted up. "My God!" he exclaimed. "Where can you get waffles in Paris?"

Generated on 2024-09-30 02:07 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Works-Councils in the United States*

Works-councils are a relatively recent development in industrial organization. Although proceeding from forces long active—a desire on the part of the employer to establish a more intimate contact with his employees, on the one hand, and a desire on the part of the workers for effective representation of their interests, on the other—the first known example of a works-council in the United States dates back only to 1904. Up to January, 1918, only 29 such organizations had been formed, so that practically all existing works-councils have been established during the past two years. Their rapid increase in number during this period is to be attributed mainly to the activity of the National War Labor Board and the Shipbuilding Labor Adjustment Board and to abnormal war-time conditions. The number of works-councils disclosed by this report—approximately 225 in 176 companies—is relatively small as compared with the total number of industrial establishments in the United States.

Practically all existing works-councils have been established during the past two years.

The largest number of these works-councils are in the various branches of the metal trades and the next largest in the shipbuilding industry. Practically all of them are in the States east of the Mississippi river. They exist under a wide variety of conditions. While often found in small establishments by far the greater number of them are in large establishments employing a high proportion of skilled and of English-speaking workers. Establishments with works-councils are about evenly divided between those in which a majority of the employees are unionized and those in which only a small proportion or none are union members. Practically all establishments having works-councils are 'open shops'.

Most works-councils are in the metal trades and the shipbuilding industry.

While a choice between the 'governmental' and the 'committee' types of organization is largely a matter of personal preference, experience indicates that the 'committee' type in general is the more desirable because of its greater flexibility. In large establishments in particular the 'governmental' type has the disadvantage that in order to be properly representative of the employees it must necessarily be so large as to be unwieldy. Also all questions, however trivial or local, arising in any part of the plant must be referred to the House or Senate, and thereby become the concern of the whole plant. These difficulties are avoidable in the 'committee' type of organization, since it permits of the development of divisional committees in the smaller units of the plant.

As between the separate and joint form of works-council, the latter appears to have some advantages. The joint works-council, composed of an equal number of representatives of the employees and of the management, tends to develop in both a sense of their mutuality of interest. As a result, its activities are likely to be co-operative and constructive. Obviously, agreement between the parties should be facilitated by reason of the fact that the representatives of both, sitting as members of the same body, hear the full facts concerning matters under discussion before they are required to take a position. A special provision authorizing either set of representatives to meet separately may, however, be desirable, since an opportunity for either group of representatives to talk over a matter among themselves, following joint discussion, may often facilitate a settlement.

The joint works-council, composed of an equal number of representatives of the employees and of the management, tends to develop in both a sense of mutuality of interest.

With respect to their constitutions, the works-councils reported upon are about evenly divided between single works-councils and works-councils based upon divisional committees. The former are found mainly in small plants; where single councils exist in large plants, the establishment is generally subdivided into voting divisions for the purpose of electing the members. Works-councils of the second class, that is, those which comprise not only a general committee for the plant but also smaller representative units, such as departmental, divisional, shop, or craft committees, are characteristic of relatively large establishments.

The latter form of organization has been found especially advantageous in large establishments, where, in order that all interests among the employees may be properly represented, a single works-council would be too large for effective work. In this connection it is to be noted that, in general, works-councils are effective in actual operation to the extent that they embrace the various elements among the employees.

It has been found necessary to determine for each establishment individually the divisions in which councils are to be set up, the only basis capable of general application being that such divisions should be natural units of the plant. The working direction, the number of employees, their occupation, their proximity at work, and other considerations have to be taken into account. The employee members of the divisional committees are chosen, of course, by the employees in their respective divisions. The employee members of the general works-council may be chosen by the employees of the plant as a whole or by the divisional committees, or they may be selected from the divisional committees. While foremen, rate-fixers, division superintendents, and other minor executives may represent the management on the divisional committees, the management's representatives on the

*Summary of Report of National Industrial Conference Board.

Generated on 2024-09-30 02:07 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

general works-council are ordinarily high executives of the establishment.

Practically all plans prescribe that an adjustment be attempted with the foreman, or other plant executive, before a matter is referred to the works-council for consideration. In a number of cases provision is made also for an opportunity on the part of company officials to use their good offices to effect a settlement in case the works-council fails to reach an agreement.

A few of the plans provide merely for the negotiation of differences between an employees' committee and certain designated officials of the company. In these cases no detailed procedure is prescribed. But most works-council plans call for the joint action of formally constituted representatives of the employees and of the management in the settlement of matters. Such action may be taken by a joint council comprising in its membership representatives of both parties, by an employees' committee meeting in joint session with a committee representing the management, or by a special sub-committee of the works-council composed of representatives of both employer and employees. Under most of the plans a simple majority vote of the combined representatives of employees and management is decisive.

Ultimate settlement of matters failing of adjustment by the works-council is provided by compulsory arbitration in a small minority of establishments. A smaller number of plans, effective, however, in over twice as many establishments, provide for final submission to arbitration if the parties at the time agree thereto. Ultimate power of settlement rests with officials or the board of directors of the company in only a few cases. The plans in effect in a majority of the establishments make no provision for further reference after the works-council has failed to reach an agreement. Inasmuch as in the experience of works-councils thus far, matters have seldom reached a deadlock, the means provided for the final determination of questions have been important chiefly from the standpoint of fixing the authority possessed by the individual works-council.

Relatively few plans qualify the right of employees to vote for members of the works-council, other than that they must be in the employ of the company at the time of the election. A majority of the plans, however, require certain qualifications from employees' representatives. The requirement most often prescribed is that they must have been in the employ of the company for a fixed period, generally one year, preceding the election. In many cases American citizenship and the attainment of the age of 21 also are stipulated.

Elections most often are by the double process of nomination and election, as distinguished from direct election. However, experience with the latter method, in the Bridgeport establishments in particular, points to its superiority in certain respects over the nomination method. A notice is posted in the shop stating the date and other particulars with respect to eligibility, manner of voting, etc. In the interval before the election the employees have an opportunity to talk over possible candidates, while the formality, loss of time, and other disadvantages accompanying the circulation of petitions or the holding of meetings for purposes of nomination are avoided. In order that a large and representative vote may be cast, it has been found desirable to hold elections on the plant premises and during work-hours or immediately thereafter.

It is important that the management refrain from all participation in the conduct of elections, so as to avoid any appearance of attempting to influence the results. It is sometimes even provided that foremen and other representatives of the management shall be absent from the place of voting throughout the time the balloting is in progress.

In a majority of plans, provision is made for meetings of the works-councils at regular intervals, with added provision for special meetings. Ordinarily, the works-council, meeting regularly, tends to do more constructive work than if it meets only upon occasion. It is desirable, moreover, to have matters of vital interest to the employees constantly before the councils, if the meetings are not to become perfunctory; again, the members have less incentive to 'make' business.

Experience with plans of employee representation has not as yet been sufficiently broad to establish finally the comparative merits of many specific features of organization. It is clear, however, that no one form of organization is applicable to all establishments alike. Differences in the size of the establishment, the personnel of the management, the character of the employees, and other particulars, require variations in the plan of organization. In general, works-councils succeed best if they are (1) comprehensive in scope; (2) sufficiently flexible to permit of adaptation and development; (3) simple and informal in structure.

No one form of organization is applicable to all establishments alike.

With the exception of the small group of 'limited' plans, all works-councils deal with the terms of employment and serve as 'bargaining committees' to the extent that they concern themselves with such subjects as hours of work, wages, and piece-rates. Most 'National War Labor Board Committees', as well as three-fourths of the employers' plans, deal with these subjects.

Works-councils have met with varying degrees of success. Of the councils regarding which experience is reported in this study, a small minority either lapsed completely or had only a perfunctory existence. With but few exceptions these were committees established upon the initiative of the National War Labor Board or the Shipbuilding Labor Adjustment Board. In most cases, works-councils are reported as having produced favorable results, although in a number of instances, chiefly of 'National War Labor Board Committees,' they have apparently accomplished little or no good. In a few cases their introduction has tended even to aggravate labor difficulties.

Works-councils have produced favorable results in most cases.

Generated on 2024-09-30 02:10 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

The beneficial result most frequently reported is an increase in good will and in co-operative spirit between employer and employee. A considerable number of employers reported specifically that labor difficulties were reduced because of the introduction of works-councils. In several instances the works-council was the means whereby strikes were prevented in individual establishments when strikes were general in the same industry or locality. It is true that labor disturbances have occurred in establishments where works-councils have been introduced. Against this unsatisfactory experience, however, are to be placed the statements of the managements of several of these establishments that, in their judgment, the works-council had modified the severity of the disturbance, and that in spite of drawbacks, they still regarded the councils as of decided value.

The beneficial result most frequently reported is an increase in good will and in co-operative spirit between employer and employee.

With respect to productive efficiency, evidences of positive benefit from works-councils are comparatively few, although in some establishments marked increases in output were attributed, in part at least, to the existence of such organizations.

Employers generally reported that a relatively high type of employee has been elected to membership in works-councils. Further evidence of this is found in the decided preference shown for men long in the service of the establishment as council members. Instances of radicalism or unreasonableness on the part of employee-members of works-councils are conspicuously few.

Against the benefits thus reported from the introduction of works-councils must be placed certain other considerations. Obviously the works-council adds to the cumbersomeness of shop management. In place of the prompt direct decision of the foreman, or other plant-executive, committee hearings, protracted negotiation, and long discussion may be required to bring questions to a final conclusion. Necessarily the works-council does not permit of the same expeditious settlement of matters that is possible where the authority of the plant executives is arbitrary and final. This apparent drawback of the works-council may prove an advantage if it serves to prevent the abuses frequently accompanying the exercise of arbitrary power. Furthermore, by providing a regular channel for the advance determination of employment questions the works-council may be instrumental in bringing about a settlement of disputed matters in time to prevent them from developing into strike demands.

Necessarily, the works-council does not permit of the same expeditious settlement of matters that is possible where the authority of the plant executives is arbitrary and final. This may prove an advantage if it prevents the abuses frequently accompanying the exercise of arbitrary power.

Experience has demonstrated that the same form of works-council may succeed in one establishment and fail in another. A feeling of mutual confidence between employer and employees in an establishment is essential to the successful introduction of plans of employee representation. So long as suspicion exists, it will tend to prevent the satisfactory operation of a works-council.

Confidence between employer and employees is essential to the successful introduction of plans of employee representation.

The personality of the manager of the plant or of the executive most directly concerned in the operation of the plan may make all the difference between success and failure. He must be in thorough accord with the idea of the works-council; he must possess the confidence of his employees and must be sympathetic and tactful in dealing with them. Where the executive is lacking in these qualities, the formation of a works-council may have the effect of actually accentuating friction and labor difficulties.

On the other hand, a works-council may be inadvisable in an establishment in which the employer through personal contact and a policy of fair dealing successfully maintains amicable relations with his employees. The employees themselves, being able satisfactorily to adjust claims and secure redress of grievances through personal negotiation with the employer, may see no advantage in a works-council.

Again, the introduction of a comprehensive plan of employee representation may be inadvisable in an establishment where the workers are relatively unintelligent and unaccustomed to organization. To place suddenly in the hands of workers unused to organized action a somewhat elaborate piece of governmental machinery may have either of two consequences. (1) The employees, failing to comprehend its meaning and workings, may take little active interest in it, in which case it will lapse; or (2) the employees, suddenly feeling their power, and being untrained to its intelligent exercise, may abuse it.

An attempt to replace active union shop-committees by a works-council is almost certain to have unfavorable consequences unless the workers acquiesce in the change. In an establishment which is highly unionized the union shop-committees represent a large share of the employees. In a closed-union shop they obviously represent all of the employees. The success of a works-council alse depends in large measure upon the manner in which it is introduced. Such a body set up abruptly without any previous preparation of the ground, or without any participation by the employees, often encounters obstacles.

In evaluating the experience assembled in this report, certain conditions must be taken into account. The first of these is the comparatively brief period during which works-councils have been in operation.

Experience with works-councils must further be judged in the light of their origin and of the unusual industrial conditions which prevailed during the war period when most of them were created.

Generated on 2024-09-30 02:05 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

It is too early to measure definitely the permanent value of the works-council movement. Approximately three-fourths of the employers having works-councils from whom an expression of opinion was secured declared themselves in favor of this form of industrial organization or that their experience had been favorable. Although further experience may lead to a revision of judgment in some cases, the results thus far obtained with works-councils indicate that they are worthy of unprejudiced consideration on the part of industry.

The results thus far obtained with works-councils indicate that they are worthy of unprejudiced consideration by industry.

Pyrometers in Heat Treating

An instance of the importance of accurate knowledge of temperatures in heat treating was given by N. B. Hoffman, chief chemist and metallurgist for the Colonial Steel Co., of Pittsburgh, in a paper presented at the recent convention of the American Steel Treaters' Society. The tests described below were made in a railroad-shop under ordinary working conditions. Twenty-four tools of each kind were heat treated, twelve, marked 'A' being heated in furnaces equipped with pyrometers and twelve, marked 'B', being heated in furnaces not so equipped or else in the ordinary blacksmith-forge. The same man handled all 24 tools of any particular kind. The carbon was between 0.80% and 0.90%, and all tools except those in test No. 4 were vanadium-steel. The details of the tests follow.

Test No. 1. Pneumatic beading-tools, $\frac{7}{8}$ in. octagon, 11 in. long.

Tools marked 'A'. Heated in a lead-bath to 1440°F.; shank temper drawn in oil to 520°F.; working-end or boot-end drawn to 470°F. The average work produced was 2850 flues per tool; variation in efficiency less than 1%; no broken tools.

Tools marked 'B'. Average work produced, 863 flues. Three tools broke in the shank, two tools broke at the radius of the boot-end. The fracture of the steel was coarse because the temperature-limit had been exceeded.

Test No. 2. Hand-chisels, $\frac{7}{8}$ in. octagon, 8 in. long.

Tool marked 'A'. Heated in lead-furnace to 1440°F. Old locomotive axle used for testing purposes. Twelve chisels received 3000 blows per chisel with a 1½-lb. hammer; at the conclusion of the test, the cutting-end of the chisel showed no signs of wear, while the head of the chisel, which received the blow, was mashed down ½ in. from original size.

Tools marked 'B'. Three tools showed fire-cracks, having the appearance of a half-moon at the cutting-edge; four tools finished the test; the other five tools broke in service because of irregular temperature in heating or forging.

Test No. 3. Cape-chisels, $\frac{7}{8}$ in. octagon, 8 in. long.

Old locomotive-axle used for testing purposes. Chipping $\frac{5}{16}$-in. key-way.

Tools marked 'A'. Twelve chisels finished test with head mashed ½ in. from original size, the cutting end showing no appreciable wear.

Tools marked 'B'. One chisel finished test.

Test No. 4. Track-chisels, 1½ in. square, 6 in. long.

Tools marked 'A'. Twelve chisels received 3000 blows from two laborers striking with 10-lb. sledges; at the finish of test the tools were mashed down 1½ in. from original size, but the cutting-edge showed no signs of wear.

Tools marked 'B'. None finished test. Three fire-cracked and were thrown out before starting; four developed cracks across the eye in service. Two chipped on the cutting-edge; three failed to work, lost the cutting-edge.

Test No. 5. Pneumatic chipping-chisels, $\frac{7}{8}$ in. octagon, 10 in. long.

Tools marked 'A'. Heated in lead-furnace to 1440° F.; shank-end temper drawn in oil to 520°F.

Chipping side-rods, engine-saddles, and smoke-stacks on locomotives, the most severe test in locomotive-shops for chisels.

Actual work performed by each chisel was 7 days, or 70 hours, before tools were ready to be ground; no tools were broken in the shank or chipped on the cutting-edge, whereas, with tools marked 'B', seven tools were broken in the shank in less than 3 hours work and the remaining five tools were broken before 10 hours work was produced.

Test No. 6. Pneumatic stay-bolt chisels, $\frac{7}{8}$ in. octagon, 10 in. long.

For cutting out stay-bolts used on locomotives.

Tools marked 'A'. Average, 163 stay-bolts per chisel; two broken tools—one shank-end and the other cutting-end.

Tools marked 'B'. Average, 27 stay-bolts; nine tools broke, both shank and cutting-end; three tools, the shank-end broke.

In a Louisiana town several months ago a negro woman was anxious to obtain some money due her from the Government. She went to one of the prominent citizens and asked him how she could get her allotment money.

"Better go to Judge Norman, Mandy," he advised her. "Then let me know how you come out."

Mandy went away, and several days later she returned to Mr. B——'s office and flourished a Government check for $120.

"Dis heah any good?" she inquired doubtfully.

"Certainly," her adviser told her. "It's a Government check, you know, Mandy, and that's as good as gold. Did Judge Norman tell you how to get it?"

"No, suh. Ah didn't go to the Judge," answered Mandy, with satisfaction. "Ah wrote right to the President, and he got it foh me!"

Generated on 2024-09-30 02:10 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Work-Routing and Cost-Accounting System of the Standard Gas Engine Company

The Standard Gas Engine Co. manufactures a general line of gas-engines at its plant at East Oakland. The plant includes a pattern-shop, foundry, machine-shop, and assembling department. Under normal conditions about 300 men are employed. Some time ago, the officials of the company became cognizant of the fact that their

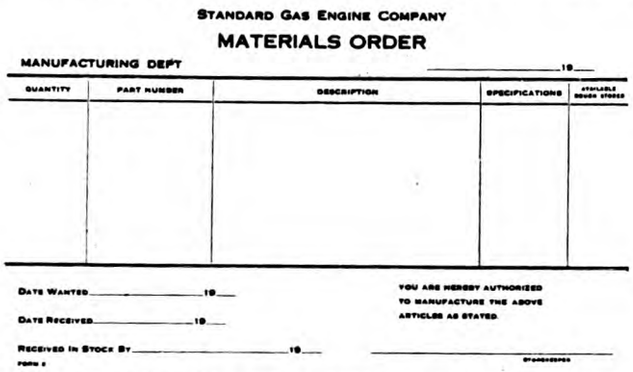

STANDARD GAS ENGINE COMPANY
MATERIALS ORDER
MANUFACTURING DEPT _____ 19__
QUANTITY | PART NUMBER | DESCRIPTION | SPECIFICATIONS | AVAILABLE ROUGH STORES
DATE WANTED _____ 19__
DATE RECEIVED _____ 19__
RECEIVED IN STOCK BY _____ 19__
YOU ARE HEREBY AUTHORIZED TO MANUFACTURE THE ABOVE ARTICLES AS STATED.

FIG. 1. MATERIALS ORDER, COPY FOR MANUFACTURING DEPARTMENT

method of cost-accounting and of keeping track of the work on its way through the shop had not kept pace with the improvement in the manufacturing methods. A thorough study was made of the conditions of manufac-

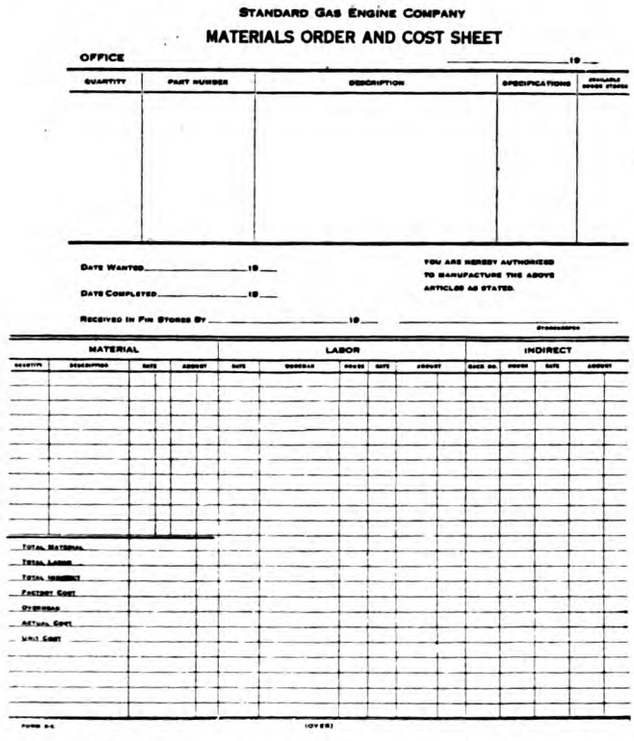

STANDARD GAS ENGINE COMPANY
MATERIALS ORDER AND COST SHEET
OFFICE _____ 19__
QUANTITY | PART NUMBER | DESCRIPTION | SPECIFICATIONS | AVAILABLE ROUGH STORES
DATE WANTED _____ 19__
DATE COMPLETED _____ 19__
RECEIVED IN FIN STORES BY _____ 19__
YOU ARE HEREBY AUTHORIZED TO MANUFACTURE THE ABOVE ARTICLES AS STATED.
MATERIAL | LABOR | INDIRECT
TOTAL MATERIAL
TOTAL LABOR
TOTAL INDIRECT
FACTORY COST
OVERHEAD
ACTUAL COST
UNIT COST

FIG. 2. MATERIALS ORDER AND COST SHEET, COPY FOR OFFICE

ture and the system described below was developed and placed in operation. The results after several months of trial have been found entirely satisfactory.

Before an order of any kind is started, the materials order shown in Fig. 1 is made out. One copy goes to

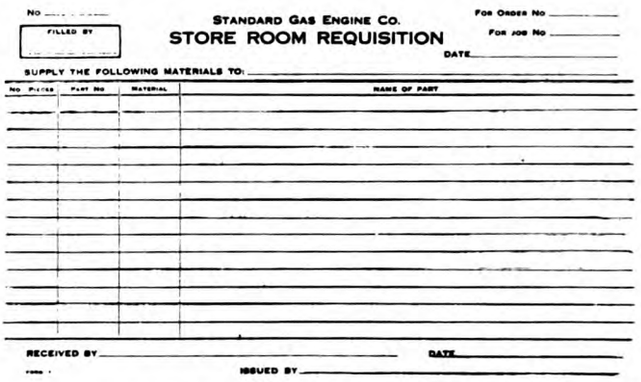

No _____
FILLED BY
STANDARD GAS ENGINE CO.
STORE ROOM REQUISITION
FOR ORDER No _____
FOR JOB No _____
DATE _____
SUPPLY THE FOLLOWING MATERIALS TO: _____
No PIECES | PART No | MATERIAL | NAME OF PART
RECEIVED BY _____ DATE _____
ISSUED BY _____

FIG. 3. REQUISITION FORM

the manufacturing department as shown, and a copy also goes to both the foundry and the pattern-shop, the printed part of the order differing slightly in each case. A fourth copy, which also includes space for recording costs as shown in Fig. 2, goes to the office. The blanks for the four orders are bound in the same carbon pad, so that the upper division of all four is filled out at one writing. The office copy is also ruled on the reverse side

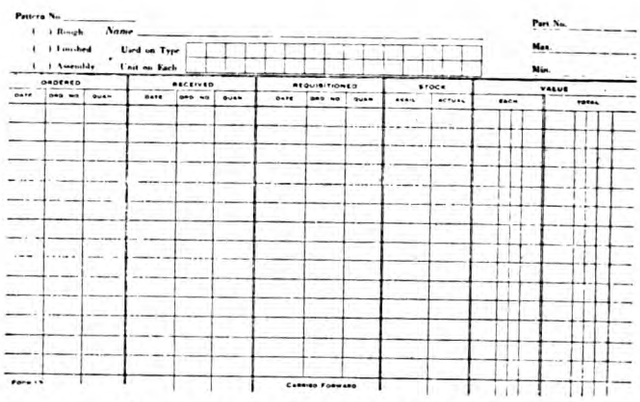

Pattern No. _____
( ) Rough Name _____
( ) Finished Used on Type
( ) Assembly Unit on Each
Part No. _____
Max. _____
Min. _____
ORDERED | RECEIVED | REQUISITIONED | STOCK | VALUE
DATE | ORD NO | QUAN | DATE | ORD NO | QUAN | DATE | ORD NO | QUAN | AVAIL | ACTUAL | EACH | TOTAL
CARRIED FORWARD

FIG. 4. PERPETUAL-INVENTORY CARD

in columns for material, labor, and indirect charges, so as to provide additional room for entries if necessary.

Materials from the store-room for the use of any department are requisitioned on the form shown in Fig. 3. As will be seen, each job has both an order number and a job number assigned to it. Stock in any department is listed on the form shown in Fig. 4. This form is printed on cards. Small tags of different colors show the de-

Generated on 2024-09-30 02:06 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

partment where the stock is, making it possible to pick out the cards for any particular department without stopping to examine them. By using these cards, a perpetual inventory of the entire plant is carried along, the total space required being an ordinary-sized desk-drawer.

Cards as shown in Fig. 8 have been prepared for the manufacture of each part used on the company's engines. The various headings are self-explanatory. Where the part is made by the company itself, 'Standard Gas Engine Co.' is entered under 'Mfg. by'. These sheets govern all the manufacturing operations, so that the foremen are able to devote their time to the actual oversight of the work, and not to the determination of methods of manufacture. For reasons that will be obvious to anyone acquainted with Pacific Coast industrial conditions, the estimated time as well as the time entries on the workman's card are not used for any other purpose than determining costs.

Name		**Order No.**
Mach.	**Man's No.**	**Man's No.**
No. Started	**Rate**	**Part No.**
No. Finished	**Overhead**	**Total Cost**
No. Rejected	**Total**	**Unit Cost**
Remarks:		

FIG. 5. LABOR-RECORD SLIP

The forms used for obtaining the preliminary records of labor cost are shown in Fig. 5, 6, and 7. Fig. 6 shows the form given to the workman himself before he starts work. It is printed on a heavy card. Fig. 7 shows the reverse side of the card, giving directions for the operation, as already worked out on the operation analysis sheet shown in Fig. 8, already described. The form shown in Fig. 5 is printed on ordinary paper and is for the office of the manufacturing department. In this office is the large bulletin-board shown in Fig. 9. A space on this board is provided for each machine, the kind, type, and size of the machine being shown in large metal letters. Directly below this is a small clip for a cardboard number corresponding to the payroll number of the man working on that machine. Below this are two clips, one for 'Work Ordered' and the other for 'Work in Progress'. These hold the slips shown in Fig. 5. A glance at the board shows the job now in progress on each machine, and also the next jobs to be done on each machine. A similar board shows the bench work, and another the assembly work.

On a column near each machine are two clips like those on the office bulletin-board, for holding the workman's card (Fig. 6), thus showing both work in progress on the machine and the next work to be done. The entire

OPERATION ANALYSIS

Used on Models — Material — Specification No.
No. Per Unit — Mfg. by

WEIGHT: Rough, Finished, Diff. Lbs., % — UNITS: Per Piece, Per Unit — TIME: Max., Min. — APPROVAL: Gen. Mgr., Chief Eng., Super, Man. Mgr.

Production
Storeroom
Purchase

OPERATION	NO.	MACHINE	LOCATION	TOOL	JIG	GAUGE	SET UP	SPEED R. P. M.	FEED INS	CUT. INS	EST. TIME	RATE DOLLARS	COST PER OP. DOLLARS	COST PER OP. CENTS

Sheet No. Schedule No. Drawing No. Pattern No. Part No.

FORM 49

FIG. 8. OPERATION-ANALYSIS SHEET

Generated on 2024-09-30 02:05 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Name _____ Order No. _____

Mach. _____ Man's No. _____ Man's No. _____

No. Started _____ Rate _____ Part No. _____

No. Finished _____ Overhead _____ Total Cost _____

No. Rejected _____ Total _____ Unit Cost _____

	STOP	START	STOP	START	STOP	START	STOP	START	STOP	START	STOP	START	STOP	START	STOP	START	STOP	START	
ELAPSED TIME																			
CLOCK																			TOTAL

OPERATION ON PART NO.

Operation	No.	Tool	Jig	Guage	Set Up	Speed	Feed	Cut

FIG. 6 AND 7. TWO SIDES OF LABOR-RECORD SLIP GIVEN TO WORKMAN

factory is controlled by one master-clock, and there are clocks connected with this master-clock distributed so that there is one within twenty feet of the working-place of each man. When a man starts an operation according to the directions on the reserve side of the card, he goes to the nearest clock, and punches his card, showing hours and hundredths of an hour. When he finishes the operation, he punches the card again. The 'Labor' column in Fig. 2 is filled out from these cards and the proper extensions made.

The 'Planning Sheet', shown in Fig. 10, is used for routing and keeping track of all the work. The first and second columns are self-explanatory. The third shows the number of pieces ordered. Space is given under 'Operation' for 36 different operations, which is enough to cover the most complicated parts used. If, say, only 14 operations are required for a particular article, a line is drawn through the spaces from 15 on to 36. Then, as the reports come in, spaces 1 to 14 are crossed out following the progress of the work. Special notes, such as '3 pieces rejected' are entered in the remarks column. The sheet is made large enough so that the status of all the work may be shown upon it.

After material, labor, and indirect costs have been determined and entered on the sheet shown in Fig. 2, the factory cost is determined from these. Each month, the overhead charges are determined and distributed over the articles produced, and the percentage that this over-

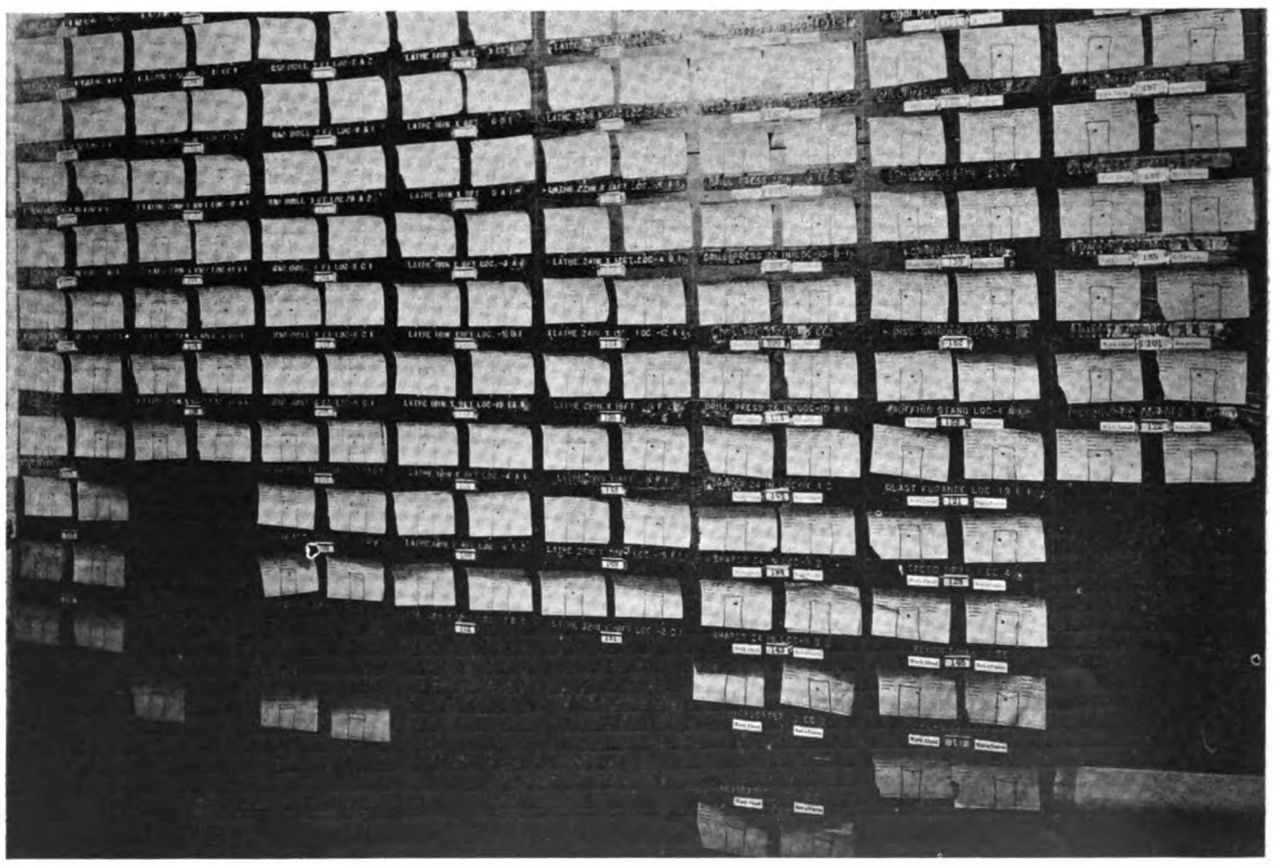


FIG. 9. OFFICE BULLETIN-BOARD, SHOWING ALL WORK IN PROGRESS IN SHOPS

Generated on 2024-09-30 02:11 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

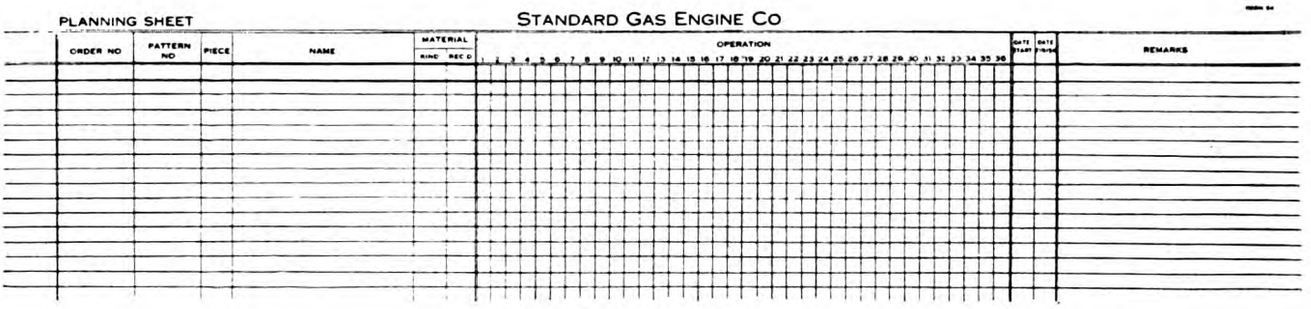


FIG. 10. PLANNING-SHEET

head bears to factory cost is determined accordingly. This percentage is used to determine actual cost from factory cost during the following month. There is, of course, variation in the overhead from month to month, but this is unavoidable, and the method used permits a close approximation to the actual cost of each article produced. Selling cost is included in the overhead. For the company's engines, however, this is a relatively unimportant item, since nearly all of them are sold either direct without solicitation, or else through agencies operating on a straight commission basis.

The time-recording system was installed by the International Time Recording Company.

Cerium in Cast-Iron

The use of cerium as a deoxidizer for cast-iron was discussed in a paper presented at the convention of the American Foundrymen's Association by Richard Moldenke. Since cerium melts at 1180°F., its ferro-alloy lends itself readily to assimilation in molten cast-iron. The principal source of cerium is the monazite sands of Brazil and India. It is supplied to the trade in a form known as misch metal, which contains 50 to 60% cerium, and the remainder mainly lanthanum, didymium, samarium, and other rare metals. Misch metal melts at about 1380°F. For most metallurgical work, this is further diluted by 30% of iron, making an alloy that melts somewhere between 1480° and 1650°F. The cerium group of metals has a great affinity for oxygen, and the heat of formation of the oxides is considerable. The result is that besides purifying the metal into which the cerium alloy is introduced, the 'life' or fluidity of the metal is prolonged considerably. The castings are therefore softer and more dense, since feeding through gates and risers is prolonged, and the formation of combined carbon is retarded correspondingly.

Tests were made with various kinds of cupola mixtures, ranging from all pig-iron to all scrap. The results showed an increase of transverse strength and of deflection before breaking in the mixtures to which cerium was added, as compared with mixtures to which it was not. The improvement in qualities after 0.1% of cerium was exceeded was relatively small. This proportion is ordinarily sufficient to effect deoxidation, and, unless it is exceeded, little of the cerium will be found in the casting. It is interesting to note that the addition of cerium increases the amount of slag.

Chill-blocks were cast from each ladle so that a comparison might be made between normally set and artificially cooled metal. The results were instructive, as the fractures indicated a prolongation of the setting-period for metal treated with cerium, as against the untreated metal. Indeed, observation was made of a distinct heating of the bars when passing the point of recalescence in cooling, besides the heating of the molten metal in the ladles as the result of the alloy addition. This indicates that, where important work is made and it is essential to feed well, cerium alloy should be used or else treated metal should be poured into the risers while pumping, so that the period of feeding may be continued as long as possible.

It was noted that the chill-tests of the gray-iron sets showed relatively softer metal and fractures with smaller chilled rims for the treated material than for the original metal from the same ladles. The re-melted car-wheels gave strong test bars, the treated ones considerably grayer than the untreated ones. The chill tests showed mottling for some of the treated metal where as the untreated chills had white fractures with magnificient crystallization. The conclusion follows that in deoxidizing by means of cerium, as with any deoxidizer, the purified molten metal is given a better chance to set under natural conditions, being relieved from a too rapid freezing action with consequent formation of undue amounts of combined carbon. The metal, therefore, becomes softer, is machined more easily, is freed from gas and pin holes, undue casting-strains, and has less internal shrinkage than where the metal suffers from oxidation through imperfect melting practice.

THE Red Cross doctor was examining a doughboy who had been badly wounded in both hands.

"Do you think I'll be able to play the piano when I get well?" he asked.

"Certainly you'll be able to play the piano."

"That's funny," remarked the soldier, "I never could play one before."

Generated on 2024-09-30 02:10 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Metal Trades Association Adopts Works Council Plan

In the policy and shop rules adopted by the shipyards and commercial shops of the bay district, the California Metal Trades Association recognized the right of employees to organize but also took a stand unalterably opposed to either closed union or closed non-union shops. It clearly recognized the necessity for having an organization or some machinery by which the employees could protect their interests. The Association has now recommended a plan to its members that is designed to furnish the employees with the protection to which they are entitled in any disputes which may arise. The plan, as illustrated in the graphic chart, is offered as a temporary organization, which is to remain in force for a period of 90 days, during which time a permanent plan is to be prepared and a permanent organization effected. The plan is already in force in the shipyards and it is proposed, at the end of the 90-day period, to combine the good points that have been brought out in the several yards and to devise plans for the use of all, which will at least be the same in regard to underlying principles.

The plan as illustrated in the chart has been offered by the Association merely as a starting-point. Each yard has effected an organization in the manner that seems best suited to its particular conditions. Each group of workmen has a representative. In some cases a group consists of all the members of a particular craft and in others it consists of 100 men. A workman having a grievance takes the matter up with the foreman and if no adjustment can be made, it is referred to the personnel manager. If it cannot be adjusted here it is referred by the personnel manager to one of the sub-committees, which reports its findings back to the personnel manager. If the matter cannot then be settled, it is referred to the works council as a court of last resort. The works council consists of five workmen and five foremen with the personnel manager acting as chairman and representing the management. He votes only in case of a tie.

The procedure used in putting the plan into effect varied in the different yards, but the difference was only in detail. At the Union Construction Co. yard, for instance, blueprinted posters were placed at various parts of the yard announcing the plan. The upper part of one of the posters gave the organization diagram shown below. Below was the following statement:

NOTICE

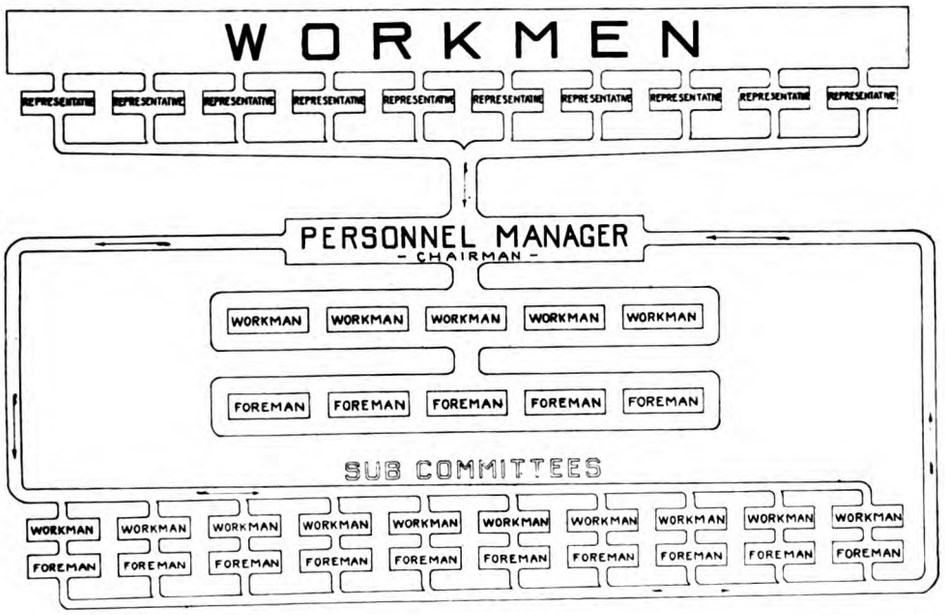
In accordance with the labor policy of this company (as posted in the yard), we desire to set up a simple plan of representation for our workmen, to serve as a medium of adjustment between ourselves and our workers, and to act upon matters of mutual interest.

The plan proposed and presented in the diagram is simple, and is to be considered the starting point from which the company and its employees may develop as extensive a plan as may be mutually acceptable.

* * * * * *

In order to create an organizing committee (to serve for 90 days) the following program is announced:

1. On January 15, the company will nominate 25 journeymen mechanics in groups of five, representing five main departments of the plant, and will also appoint an election committee of three mechanics.
2. On January 17, the company will call for the election by secret ballot and under the direction of



Generated on 2024-09-30 02:07 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

the election committee, of five journeymen, one from each group.

3. On January 19, the company will announce the result of the election, and appoint five foremen or quartermen to serve with the five elected representatives, thus forming the temporary works committee.

4. The company will then turn over to the temporary works committee the responsibility for the appointment of temporary craft representatives, for the development of by-laws, etc., and the arrangements for putting the final plan into operation, in accordance with the by-laws as finally adopted.

The other poster gave the names and departments of the 25 journeymen mechanics nominated for the works committee, also the three men on the election committee.

The following card was sent to every man on the payroll:

A CALL FOR DEFINITE CO-OPERATION

A man's most vital interest is his job, and anything directly affecting it is of first importance to him.

The differences of opinion which constantly arise between workman and employer have been settled in the past sometimes by the arbitrary power of the employer and sometimes by the arbitrary force of a labor union. Occasionally settlement has been reached by intelligent co-operation between employer and employee.

The employer always asks the co-operation of the worker. Upon this depends the stability of the industry that supports both of them.

But co-operation cannot be achieved by an executive order. Neither can it be purchased with money nor secured by force or coercion. Co-operation implies neighborliness, friendliness, mutual understanding and sympathy with the problems and difficulties of all parties concerned. The employer's interest lies in working for the employee just as the employee's interest lies in working for the employer. There can be no division of interest. Real co-operation implies a giving and taking and always toward the end of the betterment and benefit of all.

The notice posted today in this yard is in reality a call for definite co-operation. It is the first step toward bringing together all the parties whose efforts are essential to the success of the institution.

This call is for a temporary organization, which should not be confused with the ultimate machinery which must be set up in order to insure and safeguard representation, justice, and equity.

This machinery, in the making of which management and workmen will both have a hand, must be satisfactory to the worker individually and collectively, to the employer, to his superintendent, and to his foremen. The success of the organization, like the success of this yard, will depend absolutely on constructive co-operation between management and men.

The interest of the employer lies in having all employees satisfied, contented, efficient, and productive. It is to his interest to have them remain on his payroll, and the shipyard employee who is helping to bring about these conditions is also helping himself in the best and biggest way possible and doing his share in the building up of a great industry.

The following letter was sent, over the signature of the service manager, to each of the 25 men nominated for the works committee:

Dear Sir:

You have expressed your willingness to be one of the 25 candidates nominated by this company for election to the central committee of the works committee system which this company is organizing.

This whole plan is new to our men, and in order that you may be ready to answer questions which may be asked by the men, I am making the following statement:

The shipyards of the Bay district realize that if workmen are to protect their interests they must have an organization. The experience which the shipyards have had with the union system has been unsatisfactory. The shipbuilders do not feel satisfied that the union officials have been truly representative of the workmen whom they were supposed to represent. The steady, responsible, and conservative workmen have been backward in expressing themselves, and have permitted the control of their organization to pass into the hands of leaders who did not truly represent them. Because of this, the labor policy which the shipyards have adopted and which is posted in various places in the plant provides that 'the employer should not be required to deal with men or groups of men not his employees or not chosen by and from among them'.

It is therefore the duty of the company to provide some means for representation among its own employees. The ideal way would be to issue a call for an organization and let the workmen organize within the yard in whatever manner seemed most satisfactory to them. As a practical thing this would be unsatisfactory for many reasons, which are so evident as to make it unnecessary to go into them.

The next best thing is for the company to arrange for the formation of an organizing committee and to turn over to this organizing committee the responsibility for the development of a suitable plan. This is exactly what has been done, and the blueprints which are posted in the yard represent the temporary plan adopted by all of the shipyards for the sake of uniformity.

The plan is that the works committee, of five foremen and five workmen, will act as a committee of ten men, each workman having a vote and being fully equal in this respect to each foreman. This committee of ten will immediately proceed with the development of suitable by-laws, etc., so that at the end of ninety days the committee can supervise the putting into operation of the plan finally adopted, which of course must be acceptable to both the committee and the general manager of the company.

In the meantime the works committee will appoint a craft representative for each of the twenty-five or thirty crafts employed in the yard. Any grievances, complaints, suggestions, or adjustments which arise can be referred either by the workman himself or by his representative to the foreman. In case it is impossible for the workman to secure a satisfactory settlement of his grievance after he has taken it up with his leadingman, quarterman, foreman, and department head, his complaint will be referred to the works committee, whose decision will be final, except in those very rare cases when the general manager feels justified in vetoing the action of the works committee.

You are therefore a candidate for election to the works committee, and if elected, you will be one of a committee of ten, whose job it will be to do three things:

Generated on 2024-09-30 02:11 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

First: Prepare a plan for a permanent representative organization, and supervise the putting of it into effect.

Second: Adjust grievances which the workmen have been unable to adjust through their foreman in the regular way.

Third: Assist the management in such other ways as experience shows to be possible and advisable.

The following letter, also signed by the Service Manager, was sent to each of the five foremen selected by the company to serve on the works committee:

Dear Sir:

You are doubtless familiar with the proposed Works Council plan as outlined in the notice which was posted in this yard Tuesday, January 13th, and you will recognize that this plan is intended to fulfil the promise of the shipbuilders that a means would be provided whereby the workman could secure representation, justice, and equity in his relations with his employer.

Under this plan, grievances, complaints, adjustments, or suggestions are referred (either directly, or through the craft representative) to the department foreman, and, if necessary, to the department head. In those cases where it seems necessary or desirable to go further, the final decision rests with the works committee, consisting of five foremen appointed by the management and five workmen elected by secret ballot from among the workers.

The theory upon which the works committee is organized is as follows:

1. The service manager, who is the chairman of the works committee, is the personal representative of the general manager, from whom he gets his instructions. He therefore represents the interests of the management.

2. The five foremen are to be selected from among the group of yard executives, which is responsible for production and for the practical administration of the yard.

3. The five workmen represent the workers in the yard.

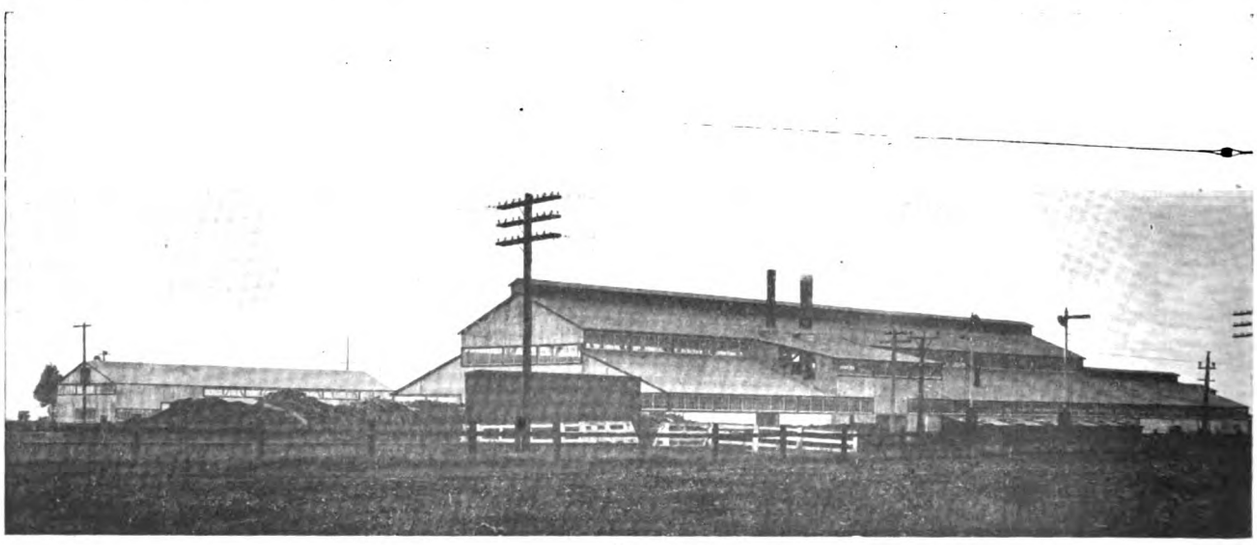
This arrangement gives us a committee which, except for the service manager, who ordinarily has no vote, is divided equally between the yard management and the workmen. It is expected that this will lead to decisions based on justice both to the men and to the company.

Acting under authority from the president of the company, and with the approval of the yard management, I have the privilege of appointing you one of the five foremen to serve on the works committee. This appointment is an expression of the confidence which the company has in you, and you will be justified in accepting the appointment with a great deal of pride.

This movement among the metal-trades employers of the San Francisco Bay district, to institute a more democratic form of works administration, is a turning point in the industrial development of this district. Both you and I know that the Union Construction Co. is absolutely sincere in its efforts to develop this organization, and I am sure that you will feel as I do, that it is a great privilege to have a part in this work.

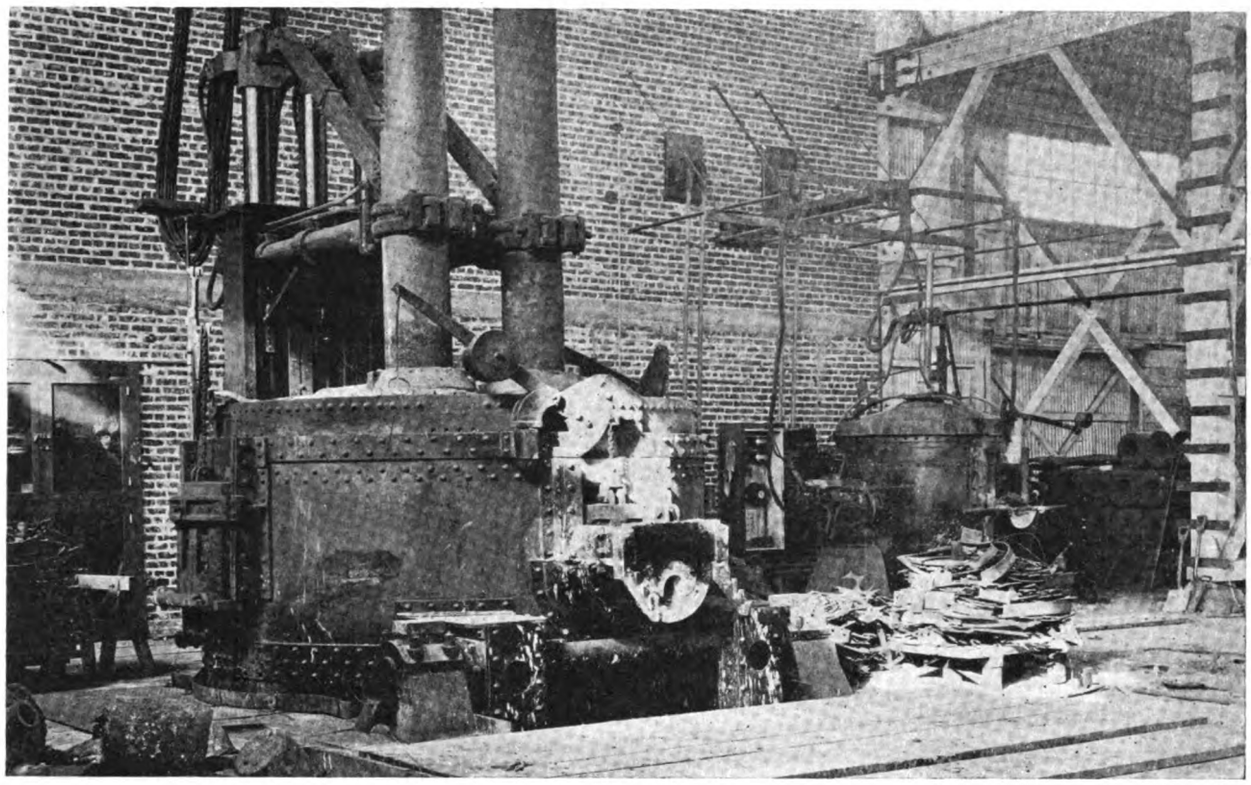
Electric Furnaces and Other Equipment of the the Best Steel Casting Company

The new iron-foundry of the Best Steel Casting Co. has been completed and is in operation. It is housed in a separate building across the road from the steel foundry. The new building is 110 by 325 ft., and divided into three bays, the middle bay being 50 ft. wide and the two side bays 30 ft. each. The middle and west bays house molding-floors and the east bay contains the cupolas, core-ovens, and core-room. There are six core-ovens and three cupolas, which latter have a capacity of 30 tons per day. The crane-equipment consists of one 10-ton and one 5-ton

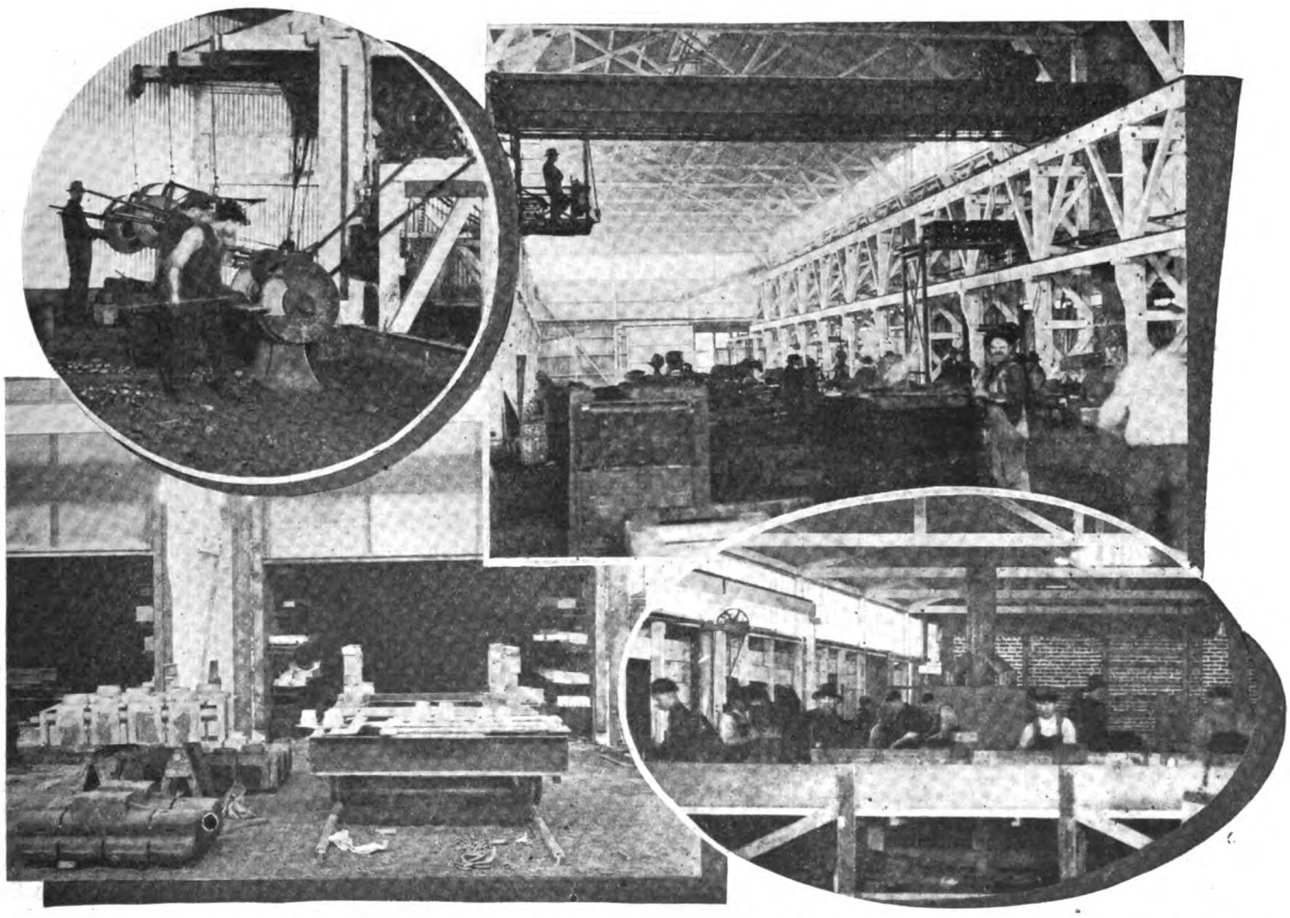


THE BEST STEEL CASTING COMPANY PLANT

Generated on 2024-09-30 02:09 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



ELECTRIC FURNACES AT THE BEST COMPANY PLANT



UPPER LEFT, PART OF GRINDING DEPARTMENT. UPPER RIGHT, MAIN BAY OF FOUNDRY. LOWER LEFT, CORE-OVENS. LOWER RIGHT, CORE-ROOM

Generated on 2024-09-30 02:10 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Pawling & Harnischfeger traveling-cranes, both in the main bay. There are also three 2-ton hand-cranes in the main bay for setting cores and three 2-ton hand-cranes in the side bay for small work. There are also two 2-ton hand-cranes in the cleaning-room. The molding equipment consists of six squeezers and a Herman jarring machine. A number of Henderson molding machines have been ordered and are being built by H. C. Macauley Foundry Co. of Berkeley. A Pangborn sand-blast has also been ordered. The equipment in the cleaning-rooms includes tumbling-barrels, grinding machinery, chippers, and other tools. A pattern-storage building, 40 ft. by 80 ft., has been built and a complete pattern-shop equipment will be installed in an adjoining building.

Several important improvements have recently been made in the steel-foundry. In addition to the two 3-ton side-blow converters, two electric furnaces have been installed. The larger is a 6-ton Heroult furnace with a capacity of four heats per day. The other, a ¾-ton Rennerfelt furnace, will be used for making special alloy-steels. Both castings and forging ingots of special steels will be made. The capacity of the steel foundry now is 1200 tons per month. A great variety of castings are made, the principal lines being tractor, railroad, gold-dredging, shipyard, sugar-mill, rolling-mill, mining, and saw-mill machinery.

The company has made a remarkable growth since it was started in August 1913, when but 60 men were employed and the output was only 50 tons per month. While the great demand for castings during the past few years has been the principal reason for this growth, another cause, and one of which the company is particularly proud, is the service that is given to customers. By service is meant particularly speed in deliveries. All jobs are routed by the 'order-of-works department'. The exact status of every job is recorded each morning, which proves of great assistance to the superintendent in getting the job completed on schedule time.

Record-Breaking Balance of Trade

The excess of American exports over imports in 1919 amounted to $4,017,000,000, a new record, according to a statement issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce. Exports for 1919 were $7,922,000,000, compared with $6,149,000,000 in 1918, while imports were $3,904,000,000, against $3,031,000,000 in 1918. December exports amounted to $681,000,000, a falling off from the $741,000,000 recorded for November. Imports also fell off for December, the total being $381,000,000, as compared with $425,000,000 for November. Both exports and imports were higher than in December a year ago. The imports of gold in 1919 amounted to $77,000,000, compared with $62,000,000 in 1918 and $552,000,000 in 1917. Exports of gold in 1919 jumped to $368,000,000 from $41,000,000 in 1918. In 1917 they amounted to $372,000,000.

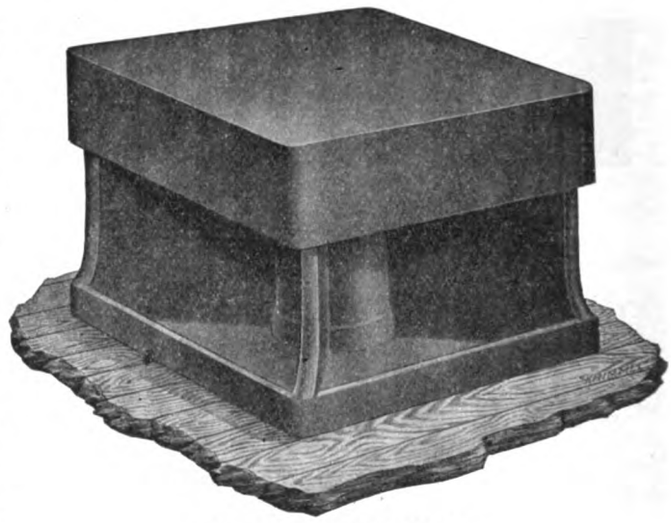
INDUSTRIAL EQUIPMENT

THE HENDERSON JARRING-MACHINE

Pacific Coast foundrymen will be interested in the announcement by the H. C. Macaulay Foundry Co., of Berkeley, that it is preparing to manufacture the Henderson improved impact molding-machine on an extensive scale. The demand for these machines has increased surprisingly, a contributory cause being the constantly increasing cost of labor.

The Henderson jarring-machine is especially designed to handle the needs of the average foundry. The expense of installing it is small. On account of the solidity of the anvils in this machine, more settling is done in the mold by a shorter stroke of the piston than with any other machine, causing less injury to the machine, pattern, flask, and surrounding floors. In all machines except those of the portable type the platen, anvil, cylinder, piston, and valve are all separate parts, put together in the simplest and best manner.

The valve is simple, is positive in action, is controlled



The Henderson Molding-Machine

entirely by air-pressure, and is set to cushion the blow of the platen at the proper position. The valves are given a set stroke, which varies slightly in the different-size machines, being shorter in the portable and smaller sizes. The number of strokes can be increased or decreased according to the work. The contact surface on the platen or upper table is exceptionally large and equally distributed over the anvil, and is so arranged that there is no peening action, which might eventually warp or spring the top surface out of true. One oil-hole is provided, which, filled with wicking and oil, keeps the entire machine in perfect working order, and needs to be filled only once a week. On account of the proper distribution of the weight in the anvil, the jar to the surrounding floor is reduced to a minimum, and the need of large concrete foundations is eliminated. Henderson molding-machines have been in operation in a large number of foundries in all sections of the coast, and have been very successful. Deliveries on practically all sizes can be made within two weeks from receipt of order. To give the best possible service to foundrymen in all parts of the West, arrangements have been made with Ditty Brothers, Inc., who maintain offices and warehouses in San Francisco and Seattle, to market these machines from each branch, ensuring service to foundrymen in both districts.

Generated on 2024-09-30 02:12 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Trade Notes

John Volante will build a machine-shop in Woodland, California.

The Stanislaus Hotel Co. will construct a $275,000 hotel at Turlock.

J. E. Azhderian will construct a $200,000 apartment-hotel at Fresno.

The Seattle Soap Co. is seeking a suitable site on which to erect a factory.

The Centennial Milling Co. will construct a $500,000 flour-mill at Seattle.

The Killefer Manufacturing Co. of Los Angeles is building an addition to its plant.

The Diamond Match Co. has commenced work on several new buildings at Chico.

George Bros. have completed a new pattern-shop at their foundry in Grass Valley.

Walter Graeb and **W. H. Main** will operate a machine-shop on Main street, Los Gatos.

The E. H. Nielsen Canning Co. is to erect a $100,000 cannery on Jones avenue, Elmhurst.

The Kinema Investment Co. will construct a theatre-building at Fresno costing $600,000.

The Braun Corporation will construct a factory-building at Huntington Park, near Los Angeles.

W. R. Covington and **G. A. Reemsnyder** will construct an automobile assembling plant at Stockton.

R. W. King is planning to erect a dehydrating plant costing between $40,000 and $50,000 at Salinas.

The Albany Iron Works, Albany, Oregon, will erect a sheet-metal shop in connection with its plant.

Caleb Johnson, of Milwaukee, will erect a $1,000,000 plant for refining cocoa-nut oil in San Francisco.

The Gray's Harbor Iron & Machine Works, of Aberdeen, Washington, has increased its capital to $150,000.

J. E. Durham has leased a tract of land at Portland for the construction of a building for a sheet-metal works.

The city of Pittsburg has recently voted $440,000 improvement bonds, including $140,000 for a water system.

The Judson Iron Works, of Emeryville, has recently installed an open-hearth furnace, a 19-in. mill, and a rod-mill.

J. E. Durham will erect a $20,000 building at Portland to manufacture automobile-bodies and other sheet-metal articles.

F. H. Stoltz, of Minneapolis, and associates will build a lumber mill at Half Moon, Montana, costing approximately $225,000.

Contract for repairing the steamer 'City of Topeka' has been awarded to the **Todd Drydock & Construction Co.** for $10,490.40.

Jerry Sitton is installing machinery and motors in a shop at Baldwin Park, California, and will conduct a general repair shop.

The San Joaquin Light & Power Corporation will construct a six-story office building at Fresno. The estimated cost is $250,000.

Ben Ostlind has purchased a block of land in Marshfield, Oregon, and will erect a plant for the manufacture of commercial veneer.

Harold L. Arnold will construct a $1,000,000 building at Seventh and Figueroa streets, Los Angeles, for an automobile-sales headquarters.

The Whatcom County Dairymen's Association of Bellingham, Washington, will erect a utility plant to cost from $150,000 to $200,000.

Construction of a plant for the **Simplex Ice Machine Co.,** at Oakland, will be begun before June. The factory will cost approximately $200,000.

Contract for construction of two steel oil-tanks at the Smith Cove terminal at Seattle has been awarded to the **Seattle Boiler Works** for $13,980.

The G. W. Hume Co., of Turlock, will spend $85,000 in extensions and improvements to its cannery. This will include $35,000 for new machinery.

Contract for the construction of three 12,000-ton tank-steamers for the **Standard Oil Co.** has been awarded to the **G. M. Standifer Construction Company.**

The Public Works Officer, San Diego, will receive bids until February 11 for the construction of a fuel-oil storage station at the Marine Corps Base at San Diego.

The Borden Condensed Milk Co., has commenced work on another unit for its plant at Modesto. The new building will be brick and steel and will be two stories high.

The California Tractors, Inc., has been incorporated in Stockton with a capital of $500,000 by Rollin M. Reed, Andy R. Udall, A. R. Hathaway, Paul Rossier, and C. M. Gill.

The Port of Portland is calling for bids, on February 2, for $750,000 in harbor improvement bonds, partly to complete work already under way and partly for new construction.

The old Crown mill at Stockton, recently acquired by the **Sperry Flour Co.,** is to be the feed centre for the Sperry organization. About $500,000 will be expended to equip the mill.

The Bristol Co. has issued catalogue No. 1301 describing its various types of recording thermometers belonging to 'Class III', for temperatures between minus 60° and plus 800° Fahrenheit.

W. S. Rogers, chairman of the board of directors of the **Bantam Ball Bearing Co.,** Bantam, Connecticut, is in San Francisco on a visit. He will remain on the Coast for two or three months.

M. L. Frielander, of San Francisco, has purchased land at Mission and Eleventh streets and will build an automobile assembling and distributing building. The name of the company is withheld.

The Sacovalley Meat Canning & Provision Co., has been incorporated at Sacramento with a capital of $500,000 and will build a packing-house and cannery. The plant and equipment will cost $200,000.

The Alameda Sugar Co. will construct a $2,000,000 beet-sugar refinery in the Sacramento valley, probably near Meridian. Work will be commenced soon enough to permit the refinery to handle the 1921 crop.

The Virden Packing Co., of Sacramento, has received subscriptions for $2,000,000 of its $5,000,000 capitalization and has been allowed by the Commissioner of Corporations to commence work on its packing-plant.

The San Joaquin Light & Power Corporation has applied to the State Railroad Commission for permission to issue $3,500,000 in preferred stock. The proceeds are to be used for power development on Kings river.

The Pacific Fruit Express Co. will spend $700,000 in increasing the capacity of its refrigerating and pre-cooling plant at Roseville, California. Electric power will be used in place of steam in the new part of the plant.

The Taylor Instrument Co., of Rochester, New York, has opened Pacific Coast headquarters at 431 Rialto Bdg., San Francisco. **Edwin M. Levy** is Pacific Coast manager. **S. F. Worswick** is manager for the San Francisco territory.

I. F. Baker of the **Westinghouse Electric International Co.,** who has been in the New York office of that company for the past two years, is on his way to Tokyo, Japan, where he will act as a special representative of the company.

Edward D. Kilburn, who since March 15, 1917, has been New York district manager for the Westinghouse Electric & Manufacturing Cc., was recently elected vice-president and general manager for the **Westinghouse Electric International Co.** This company was formed in the spring of last year to

Generated on 2024-09-30 02:05 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

succeed the Westinghouse Electric Export Co. It handles the Westinghouse foreign business and is world-wide in its scope, exclusive of the United States and Canada.

E. P. Hulme, J. L. Holman, E. J. Gates, G. C. Stephens, A. H. Breed, A. J. Treat, and A. R. McLaren have organized the **Federal Wool Manufacturing Co.**, of San Francisco. The company plans to build a $2,800,000 woolen-mill at Oakland.

The plant of the **Lisenby Manufacturing Co.**, of Fresno, is being enlarged at a cost of $17,000. The new building will contain the assembling plant, machine-shop, drafting-rooms, and rest and club rooms for the men and women employees.

The plant formerly operated by the **Columbia Engineering Works** at Linnton, Oregon, has been sold by the receivers to **Joseph Supple** and **Dan Martin.** It will be used for building wooden motorships and sailing vessels of 1000 to 1200 tons capacity.

Thomas Story has awarded a contract to Earl Newcomb for the construction of a class A building on Spring street between Sixth and Seventh, Los Angeles. Among the tenants will be the Los Angeles Stock Exchange. The estimated cost is $750,000.

Contracts have been awarded for the erection of a three-story and basement brick factory-building, to cost $75,000, on the north-east corner of Sixth and Clara streets. The building has been leased for ten years to **Henry Rhine & Co.**, candy manufacturers.

The California State Railroad Commission has approved the lease of the properties of the **Sierra & San Francisco Power Co.** to the **Pacific Gas & Electric Co.** for a period of 15 years. This will make it possible to obtain funds for the extension of the Sierra company's system.

Ackerman & Harris will construct a class A office and theatre-building at Broadway and Seventh streets, Los Angeles. The estimated cost is $1,500,000. Contract for furnishing structural and reinforcing steel has been awarded to the Llewellyn Iron Works for $500,000.

Harold H. Clark, formerly of the Los Angeles office of the **Link-Belt Co.,** is now manager for California for the company, with offices in the Hobart Bdg., San Francisco. **E. C. Berghofer,** formerly the San Francisco manager, has been transferred to the Chicago territory.

The Terminal Boiler Works has applied to the Oakland city council for a lease covering property on the western water front, adjoining the plant of the American Manganese Steel Co. The firm proposes to manufacture marine accessories and equipment, and to repair ship boilers.

W. H. Hendricks, Williamson Summers, H. E. Stewart, James J. Burke, A. P. Lewis, L. A. Corrington, E. L. Clarke, E. H. Abrams, T. L. Oddie, and W. A. Keddie have organized the **Nevada Aviation Corporation.** They intend to build a factory for the construction of aeroplanes.

The Great Western Milling Co. and the **Northwestern Milling Co.** have completed arrangements for the underwriting of their securities. It is expected that the $2,000,000 mill and grain-elevator to be built by these companies on the Oakland estuary will be in operation by July 1.

Frank M. Cobbledick, for some time sales manager for the **Union Gas Engine Co.,** has resigned in order to devote more attention to his own business of engineering specialties in San Francisco. **F. M. House,** who is just out of the army, where he attained the rank of major, succeeds Mr. Cobbledick.

Manning, Maxwell & Moore have recently taken orders for a number of Shaw cranes from Californian power companies, including the following: One 50-ton Shaw crane for the **San Joaquin Light & Power Corporation,** one 175-ton Shaw crane for the Great Western Power Co., one 50-ton and one 65-ton Shaw crane for the Southern California Edison Co.'s new power-plant, and one 100-ton crane for the Saugus plant of the city of Los Angeles.

Elections will be held on February 5 in the **Turlock Irrigation District** and on February 17 in the **Modesto Irrigation District** to vote on bond issues to provide funds for the construction of the Dom Pedro storage dam, including a hydro-electric project. The total amount of the bonds is $6,000,000.

The sales force of **Berger & Carter Co.** held their annual convention at the company's headquarters in San Francisco, December 15-20. Separate days were set aside for the various divisions of the company's activities, including the iron and steel, machine-tool, and food-preserving and canning machinery divisions.

The Continental Refining Co., of Taft and Coalinga, has purchased the old plant of the **Oriental Oil Refining Co.,** at Martinez, including 70 acres of bay shore land. The original cost of the plant was $250,000. The new owners plan to refine all their oil products at this point, and will probably construct a pipe-line from Taft.

Plans have been perfected for the amalgamation of the **American Steel Treaters' Society** and the **Steel Treating Research Society.** The new organization is to be called the American Society for Steel Treating, with headquarters at Cleveland. The official publication is to be called 'Transactions of the American Society for Steel Treating'.

At a meeting of the San Francisco Section of the American Society of Mechanical Engineers held at the Engineers' Club January 8, papers were presented by W. M. Henderson on the 'Production and Distribution of Oil Gas', by H. M. Crawford on 'Industrial Uses of Gas', and by Letson Balliet on 'Use of Oil Gas for Manufacturing and Heating Rivets'.

L. Dee Miller, who recently returned to the Industrial Accident Commission of California after two years and a half of service in the Navy, during which time he rose from the rank of ensign to that of lieutenant, has been given charge of the new division established by the safety department of the Commission for dealing with the prevention of shipyard accidents.

The Pacific Gas & Electric Co. will spend $11,406,000 for electrical development and $3,170,000 on its gas department during 1920. The first amount includes $3,180,000 for the Pit River project, $1,000,000 on improvement of the properties of the Sierra & San Francisco Power Co., which the Pacific Gas & Electric Co. recently leased for a period of 15 years.

The Union Construction Co. launched the 9400-ton tank-steamer 'Hayden' on January 24. This is the seventh of the ten ships called for by the company's contract with the U. S. Shipping Board. Work has been commenced on the Diesel-engine driven tanker 'Charlie Watson' for the Standard Oil Co., which is the first vessel to be built by the company on private account.

The rapidly increasing business of the **Pomona Manufacturing Co.,** of Pomona, California, manufacturers of pumps and irrigating machinery, has necessitated the enlarging of its foundry. A complete new cleaning-department, larger cupolas, and positive-pressure blowers, modern sand-mixing machinery, and other equipment have been installed by **Ditty Bros., Inc.,** of San Francisco.

The Board of Public Works of San Francisco will receive bids until March 3 for furnishing six 47 by 90-in. steel slide-gates for the outlet system for the Hetch-Hetchy reservoir, until March 10 for six 5-ft. balanced needle-valves, until March 24 for six 33 by 42-in. bronze slide-gates, and until March 31 for six 3-ft. balanced needle-valves. The total estimated cost of this equipment is $480,000.

The McLain-Carter Furnace Co., of Milwaukee, has issued a catalogue describing the open-hearth furnace built by the company. This furnace is designed for either acid or basic

Generated on 2024-09-30 02:06 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

melting, and, while intended for an oil-fired furnace, can also be equipped for either gas or powdered coal. The catalogue is illustrated with a number of photographs of furnaces built by the company, and also of the various kinds poured from steel produced in furnaces of this type.

The Pacific Block & Forging Co., 224 Spear street, San Francisco, are equipping a plant for the manufacture of wood and steel tackle-blocks, drop-forgings, and marine hardware for ship-chandlery trade. **H. F. Cook**, the president of the company, has represented the Boston & Lockport Block Co. in San Francisco for the past seven years. **C. H. Barstow**, the vice-president, was formerly vice-president of Ford-Barstow Ship Chandlery Co. of San Francisco.

John A. Hayden, for the past four years in charge of the core-room of the Steiger & Kerr Stove & Foundry Co., of San Francisco, has resigned and has joined **Ditty Bros., Inc.**, of San Francisco and Seattle. Mr. Hayden has had 21 years' practical foundry experience, and, in his new position, will devote his time to assisting foundrymen to solve their core and molding-floor troubles, and to the installation of modern cost-reducing equipment. The many friends of Mr. Hayden will wish him success in his new field.

An example of the ability of Pacific Coast manufacturers to compete with concerns in other parts of the country where population and volume of demand is greater is given by the remarkable growth of the **Schultheiss Manufacturing Co.**, of Los Angeles, manufacturers of pipe fittings. This company has been obliged to increase the size of its plant greatly and to purchase a number of molding-machines, as well as a large cupola in addition to the one already installed. An addition to the modern cleaning-room has also been found necessary. This equipment has been furnished by **Ditty Bros., Inc.**, of San Francisco.

The Sullivan Machinery Co. announces the following appointments: Arthur E. Blackwood, formerly manager at New York, to be vice-president in charge of finance and accounting; Louis R. Chadwick, formerly manager at Spokane, to succeed Mr. Blackwood at New York; Robert T. Banks, formerly sales engineer at the El Paso office, to succeed Mr. Chadwick at Spokane; Howard T. Walsh, to be vice-president in charge of sales; Gilbert K. Wilson, as assistant secretary in charge of cost accounting; N. H. Blatchford, Jr., as assistant treasurer; E. A. Krevis, as general auditor; and Frederick W. Copeland, as manager of foreign sales.

At the annual meeting of the **Holt Manufacturing Co.** practically all the officers and directors were re-elected. The officers for the coming year are as follows: Benjamin Holt, president; T. F. Baxter, vice-president and general manager; P. E. Holt, R. S. Springer, and M. M. Baker, vice-presidents; Percy Ehrenfeldt, secretary and auditor; C. A. Bachelder, general purchasing agent; Thomas Luke, sales manager; C. L. Neumiller, general counsel. D. N. Gilmore, formerly manager of the Stockton plant, has resigned to devote his entire time to the agency for the Holt equipment in the Sacramento valley. He continues on the board of directors. W. E. Sheperd has been appointed assistant manager of the Stockton plant.

An order for the first steel-mill electric-motor ever built for a large reversing slabbing-mill, with a complete set of accessory apparatus, has recently been placed by the Imperial Steel Works of Japan. The manufacturer who will furnish the apparatus is the **Westinghouse Electric & Manufacturing Co.**, and the order is the second for electrical steel-mill equipment to be received by this company from the Imperial Steel Works. The equipment is to be used with a slabbing-mill with which it is expected to roll steel ingots weighing up to 25 tons, down to slabs having a maximum dimension of 17 by 46 in. and a minimum of 4 by 20 in. The motor will be of the double-unit reversing slabbing-mill type, of 5800 hp. continuous capacity and 17,600 hp. momentary. It will have a speed range of 47 to 90 r.p.m. and will use direct current at a voltage of 700. Power for the motor will be furnished by a motor-generator consisting of two 700-volt direct-current generators driven by one alternating-current motor. The generators each will be of 3000-kw. capacity, and will operate at a speed of 368 r.p.m. They are to be connected in series with the reversing motor and will be designed to stand the same momentary current peaks that it does. The motor which drives the two generators will be of the 8-pole wound-rotor induction type, and will be of 6250 hp. capacity.

All the sales and contracting business formerly carried on by the **General Fire Extinguisher Co.** will be taken over by the **Grinnell Co., Inc.** This change has been made because the old name so specifically described the automatic fire-protection section of the company business that it was misleading. As a matter of fact the company's business is based on industrial piping, and it is perhaps the largest concern in the United States doing that sort of work exclusively. The related lines that the Grinnell company takes over from the General Fire Extinguisher Co. consist of fire-protection; power and process piping; steam, hot-water, and gas-heating; drying; and sales of pipe, fittings, valves, and supplies.

Westinghouse opportunities for technical graduates are thoroughly explained in an illustrated pamphlet bearing that title, recently issued by the **Westinghouse Electric & Manufacturing Co.** This booklet describes, in considerable detail, the plan developed by the company for the training of the graduates of technical schools at all of its various works. In the booklet is included a list of prominent Westinghouse men that originally entered the company as graduate students, as well as a complete list of schools from which over 5000 students have entered the employ of the company. Copies of the booklet will be sent to anyone interested on application to the educational department of the company at East Pittsburgh.

When the **Manufacturers Aircraft Association** holds its Second Annual Aeronautical Exposition at New York in March 1920, the public will have an opportunity to see what American designers have accomplished in developing commercial aeroplanes, planes for private use, for sporting or touring purposes, or for long-distance transportation of freight and mail. The aeroplane owes its development principally to the War. Since hostilities ceased, American manufacturers have concentrated their efforts on planes for pleasure, sport, and commercial uses. The exhibits will represent all producing aeroplane factories in the United States. Many of the planes are already assembled and in daily flights. Some of the larger ones are carrying mail between principal cities. Others of advanced construction will receive trial flights a few weeks before the exposition opens on March 6. Many of the models have comfortable enclosed cabins with unbreakable glass windows. They seat from four to twelve passengers in chairs as luxuriously appointed as those of a Pullman. Noise of the motors is deadened and passengers enjoy a flight much the same as if they were riding in an observation car or limousine without the wheels touching the ground. The larger planes have a carrying capacity of from 3000 to 6000 lb. and, driven by three or four motors, will cover half the distance across the United States in a single flight.

To meet the demand for more information regarding successful personnel management, a unique training program is being announced by the **Pacific Coast Bureau of Employment Research.** The majority of executives feel that the only available information on this subject is widely scattered in semi-confidential reports, or is a part of the experiences of a small number of progressive leaders. What executives in the Bay region need is the counsel that comes from the condensed experience of practical men throughout the country. The Bureau plans a series of 40 meetings, part of them discussion and conference meetings, and part of the inspections

Generated on 2024-09-30 02:05 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

of manufacturing and commercial enterprises, which will give just this kind of information and training. The series of meetings will be directed by Roy Willmarth Kelly, formerly in charge of employment management courses at Harvard University, and author of 'Hiring the Worker', 'Training Industrial Workers', 'The Shipbuilding Industry', and numerous magazine articles on employment management and vocational guidance. The course will commence February 11 and continue on Wednesday evenings and Saturday afternoons to June 26. Assisting Mr. Kelly will be the Bureau's staff of specialists in personnel management, together with professors from the departments of applied psychology and economics at Stanford University and the University of California. Particulars regarding the series may be had at the Bureau's offices, Flood building, San Francisco.

The Electric Furnace Co., Alliance, Ohio, sold a number of furnaces during the last quarter of 1919 that are of special interest on account of the new type of equipment involved and the special alloys which are to be melted in these furnaces. The Standard Sanitary Manufacturing Co., Louisville, Kentucky, has just installed its fifth Baily electric furnace for melting yellow brass. McRae Roberts Co., Detroit, Michigan, has installed its third Baily furnace. Nolte Brass Co., Springfield, Ohio, has recently installed its second Baily furnace. White & Brothers, Philadelphia, Pennsylvania, have installed a 105-kw. furnace of 1500 lb. capacity. Akron Bronze & Aluminum Co., Akron, Ohio, has installed a 105-kw. furnace, melting red and yellow brass. Union Brass & Metals Co., St. Paul, Minnesota, has installed a 105-kw. furnace for melting red and yellow brass. American Hardware Co., New Britain, Connecticut, has installed a 105-kw. furnace for melting brass. Roberts Brass Works, Detroit, Michigan, has placed an order for three Baily furnaces, each of 1500 lb. capacity. Westinghouse Electric & Manufacturing Co., Pittsburgh, Pennsylvania, has installed a 50-kw. furnace, of 500 lb. capacity. Wasson Piston Ring Co., Plainfield, New Jersey, has placed an order for a 500-lb. furnace for melting gray iron. Kayline Co., Cleveland, Ohio, has purchased a 50-kw. furnace of 500 lb. capacity, for melting yellow brass. Mitsui & Co., of Japan, has purchased a 150-kw. nose-tilting furnace of one-ton capacity, together with a special motor-operated casting-table, so designed that metal may be poured directly into the molds. Similar equipment, but with three casting-tables, has been purchased by the Parrish Pool Co., of Cleveland, Ohio. The West Virginia Metals Corporation will install two Baily units, each of 1500 to 2000 lb. capacity. Both will be nose-tilting furnaces. Lamson & Sessions Co., Cleveland, Ohio, has purchased a 40-kw. hearth-type furnace for heat treating bolts.

Obituary

David Hollywood, general manager for the Southwestern Shipbuilding Co. of Los Angeles, was killed in an automobile accident January 20.

John F. Dodge, the Detroit automobile manufacturer, died of pneumonia January 14 at New York. He was born at Niles, Michigan, in 1865. He learned the machinist's trade in his father's shop. In 1901, with his brother Horace, he established a small machine-shop at Detroit. They early commenced making a specialty of automobile parts. In 1902 they acquired a large block of stock in the Ford company in return for making parts for the company. This stock was held by the Dodge brothers until 1916. After a number of years of making parts for other cars, the Dodge brothers decided to start manufacturing their own automobile, selling their first machines in 1914.

POSITION WANTED

As foundry foreman by up-to-date foundryman on all classes of work and machines; only open shop considered. Address PW 108, Metal Trades, 420 Market St., San Francisco, Cal.

ENGINEERING SOCIETIES FOR HOOVER

The following resolution was unanimously adopted by the Joint Council of Engineers of San Francisco, January 13, 1920:

Whereas, There is at this time a strong and widespread sentiment for Herbert C. Hoover for President of the United States as an independent candidate, free from political deals and pre-election pledges; and

Whereas, Mr. Hoover, by his work in Europe, has shown executive and administrative abilities of the highest order, particularly fitting him for handling both the economic problems of reconstruction at home, and our relations with other nations; and

Whereas, The Joint Council of Engineers of San Francisco has a patriotic duty to perform at this time, not only as representing Engineers, but also as a representative body of American citizens; be it therefore

Resolved, That the Joint Council of Engineers of San Francisco, representing 2000 engineers in the Bay district, endorses Herbert C. Hoover for President and invites the engineering bodies of the United States to join with it in forming an organization to further Mr. Hoover's election, and in such other activities as will ensure the affairs of the Nation being handled on an efficiency and non-partisan basis, and be it further

Resolved, That copies of this resolution be sent to all engineering organizations and technical journals throughout the United States, and that such other steps be taken as will further the movement of 'Hoover for President'.

Market Review

With the collapse of the steel strike and with the coke industry recovering from the effects of the coal strike, the iron and steel industry is approaching normal output, but the accumulated demand of the past few months is so great that it will take a long time for normal conditions to return. Prices of iron and semi-finished steel and also most steel products continue to advance. A new factor in the market is that of prospective railroad purchases. Railroad buying has been restricted during the entire period of Government control, and the companies are now in need, not only of rails but also of almost every other kind of steel products. With the return of the railroads to private ownership on March 1, it is expected that the companies will be heavy buyers. No. 2 foundry pig-iron is quoted around $41 and $42 at Pittsburgh, and the prevailing price on billets is $50. The U. S. Steel Corporation still refuses to advance its quotations on most finished products, but in the general market large premiums are common for early delivery.

The shortage of supply in the local iron and steel industry is becoming, if anything, more pronounced. Most furnaces are refusing to accept orders for pig-iron, and the same is true in general for the steel mills, so that mill price of $4 base has a purely nominal significance. The warehouse base price has increased to $5. A local jobber has several hundred tons of Scotch pig-iron on the way to this port, which is to be sold at $60, ex dock San Francisco.

Local prices of non-ferrous metals are as follows:

Electrolytic copper	20.00
Casting copper	19.50
No. 1 red ingot brass	18.75
No. 1 yellow ingot brass	14.50
Electrolytic zinc	11.00
Prime Western zinc	10.00
Lead, carloads	8.75
Lead, less than carloads	9.00
Tin	65.00

Generated on 2024-09-30 02:07 GMT / https://hdl.handle.net/2027/uiug.30112007837690
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN